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Summary of Public Comments on Report to Congress Titled: Wastes from the Extraction and Beneficiation of Metallic Ores, Phosphate Rock, Asbestos

ICF Inc.
Washington, DC

Prepared for

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Summary of Public Comments

Report to Congress

December 1985

Wastes from the Extraction and Beneficiation of Metallic Ores, Phosphate Rock, Asbestos, Overburden from Uranium Mining, and Oil Shale

June 1986

Prepared for:

U.S. Environmental Protection Agency
Large Volume Waste Program
Special Wastes Branch

Prepared by:

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1. ORGANIZATION AND APPROACH

This document is a summary of the comments received in response to the EPA Report to Congress (Report) titled:

Wastes from the Extraction and Beneficiation
of Metallic Ores, Phosphate Rock, Asbestos,
Overburden from Uranium Mining,
and Oil Shale

which was sent to the Congress on December 31, 1985. The Report (EPA/530-SW-85-033) presented studies which were done pursuant to Sections 8002 (f) and (p) of the Resource Conservation and Recovery Act of 1976 (RCRA), as amended, (42 U.S.C. §§6982 (f) and (p)).

1.0 ORGANIZATION

The public comment period ended March 31, 1986 and comments were received by the EPA docket clerk until (and after) that time. In addition, public hearings were held in Washington, D.C., Denver, CO and Tucson, AZ. This report summarizes all of the comments directed to the EPA, both in writing and during the public hearings.

Chapter 1 of this report describes the approach used to summarize these comments and the method by which they were included in this document. This chapter also lists all of the companies, organizations, agencies and individuals who took the opportunity to respond to the EPA.

The comments in this summary report are organized into five chapters that follow chapter one. These chapters subdivide the comments received into major categories. They are:

- **Legal/Procedural** -- Comments which were perceived to indicate legal and procedural deficiencies in the Report To Congress.
- **Technical** -- Comments that reflected the technical and analytical adequacy of the Report (the bulk of the comments received).
- **Regulatory** -- Comments which dealt with the regulatory need in the mining industry and the overlapping of existing statutes.
- **Economic** -- Comments which provided assessments of mining costs and impacts.

- **Recommendations** -- Summaries of recommendations made by the commenters to the EPA regarding all aspects of the Report.

1.1 APPROACH

All of the comments received, both public hearing transcripts and written comments, were read in their entirety.[1] Comments and responses that covered similar topics were grouped together for presentation in this document.

All respondents were cataloged according to their EPA docket number and name. In the case of oral testimony, comments were organized according to their order of appearance in the written transcripts of the proceedings. Commenters were identified according to the organization which was on the letterhead of the transmittal letter. In the case of mining companies represented by law firms, the company was noted for the record and the law firm was noted parenthetically. In some cases individuals wrote letters on company stationary but distinguished themselves as commenting on their own behalf.

All comment summaries refer to the respondents by giving the name, docket number, and page on which the comments were found. This format is:

Newmont Services Ltd. (006); p. 6.

An Index at the back of this document lists those who commented and categorizes them as mining companies, mining associations, citizens groups, etc.

The five main comment subdivisions were further divided into the following categories:

Legal/Procedural

- Report Did Not Fulfill Congressional Mandate for a Comprehensive Study.
- Report Did Not Address Processing Waste.
- Report Failed to Use Expertise of Other Federal and State Agencies.

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[1] Appendices and attachments to written comments were reviewed for substance and incorporated only when they provided additional comments not supported in the body of the text.

- Report Conclusions are Inconsistent with Supporting Data and Analyses.

Technical

- Risk to Human Health and the Environment from Mine Waste not Demonstrated.
- The Damage Cases Documented in the Report Do Not Support a Determination that the Mine Wastes are Hazardous.
- The Report Failed to Adequately Distinguish Between Past and Current Waste Management Practices.
- Site Specific Characteristics Not Considered.
- Inappropriate Methodology and Criteria Used For Determining the Hazard of Mine Waste:

  -- E.P. Toxicity Test
  -- Corrosivity Test
  -- Acid Forming Potential
  -- Cyanide
  -- Radioactivity
  -- Solubility
  -- Asbestos
  -- Other

- Incorrect Distinction Between Waste Streams and Process Waters.
- Sampling Errors.
- Data Interpretation.
- Identification of the Need for Further Study.

Regulatory

- RCRA Regulation of Mine Waste is Unwarranted.
- Applicability of RCRA Regulation to Mine Waste Management.
- Existence of Overlapping Federal and State Regulations.
- Need for Site-Specific Regulatory Flexibility.

Economic

- Assessment of Compliance Costs and Estimating Methodology
- Assessment of Economic Impacts

Recommendations

- Summary of Recommendations Made Earlier
  - -- Legal/Procedural
  - -- Technical
  - -- Regulatory
  - -- Economic

1.2 SUMMARIZING METHOD

The method used to catalog and summarize the hundreds of comments received was carefully applied to each written and oral submittal. All of the comments which contributed to the substantive assessment of the EPA Report to Congress are summarized in this document.

Many comments reviewed the legislative history and background of the Bevill Amendment and other sections of RCRA. These and other comments summarizing the activities and interests of the commenter were not included in this document unless they raised specific issues useful to the EPA. Many commenters expressed issues and concerns regarding the Report's contents which were either redundant to each other or overlapped to a great extent. In summarizing these comments, it was necessary to generalize to the extent that some nuances in comments were unavoidably lost. Thus, this summary document does not attempt to replace the written record provided by the respondents.

The comments received were at times specific to individual segments of the mining industry and at other times general to the industry as a whole. In summarizing these comments judgments had to be made as to whether the industry-specific nature of the comment should be retained verbatim or included in with industry-general comments. Every attempt was made not to compromise the intent of individual points of view.

Minor points dealing with such topics as the administrative problems of obtaining copies of the Report or notification of public hearings were not included in this summary document.

In each grouping of summarized comments dealing with a common topic opposing or contrary views were at times expressed. These comments were included in the summaries under the heading: Opposing Viewpoint. In all cases the majority opinions were presented first and the minority comments were summarized as the "opposing" viewpoint.

Where recommendations were made by respondents, they were included in with each summarized category in this report. In addition, Chapter 6 presents major recommendations a second time for easy identification.

1.3 COMMENTS RECEIVED

There were 61 individual sets of comments received by the docket clerk (actually there were 63, however two were re-submissions to make corrections). These comments totalled over 800 pages of text along with a considerably greater number of appendicies, attachments, and referenced reports.

During the public hearings held in Tucson, Arizona; Denver, Colorado; and Washington, D.C., a total of 37 individuals (representing various organizations) also gave testimony. The transcripts of these hearings amounted to approximately 300 pages.

The categories of those who responded, either in writing or orally, are as follows:

Written Comments

State Agencies	4	Wyoming Department of Environmental Quality Montana Department of State Lands Missouri Department of Natural Resources South Dakota Department of Water and Natural Resources
Federal Agencies	3	Bureau of Mines Bureau of Indian Affairs, Navaho Area Office Tennessee Valley Authority
Mining Associations	6	Idaho Mining Association Northwest Mining Association Nevada Mining Association Minerals Exploration Coalition Wyoming Mining Association Alaska Miners Association
Trade Associations	4	The Fertilizer Institute American Mining Congress Asbestos Information Association Rocky Mountain Oil & Gas Association
Universities	2	University of Missouri - Rolla, Environmental Research Center University of Idaho
Private Citizens	6	Phil R. Fikkan David Paul Parker Craig Simon

		Victor Kollock Steven R. Murray Samuel Dunaway, Jr.
Consultants	4	James M. Montgomery, Consulting Engineers, Inc. Foth & Van Dyke and Associates, Inc. Ventures Trident H. F. Magnuson Company
Mining Companies	32	Superior Mining Company Placer, U.S. Inc. Newmont Services Ltd., a subsidiary of Newmont Mining Corporation Lacana Mining Inc. FMC Corporation Kaiser Aluminum & Chemical Corporation, Aluminum Division Kaiser Aluminum & Chemical Corporation, Industrial Chemicals Division and Harshaw/Filtrol Partnership Phelps Dodge Corporation Coeur-Thunder Mountain, Inc. Battle Mountain Gold Company St. Joe Minerals Corporation AMAX Inc., Western Area Law Department, AMAX Mineral and Energy Homestake Mining Company ASARCO Incorporated Unocal Corporation Sunshine Mining Company FRM Minerals, Inc. Gulf & Western Industries, Inc. Kennecott Copper Corporation Minatome Corporation NERCO Minerals Company Hecla Mining Company Monsanto Chemical Company Rocky Mountain Energy, a subsidiary of Union Pacific Corporation Reynolds Aluminum, Reynolds Metals Company Exvenco Resources Inc. Gold Fields Mining Corporation Brush Wellman, Inc. Coeur Explorations, Inc. J. R. Simplot Company Duval Corporation Texasgulf Minerals and Metals, Inc.

Public Hearing Testimony

State and Local Agencies	4	Colorado Department of Health Arizona Department of Health Services, Office of Waste and Water Quality Management

		Pima County Health Department Pima Association of Governments
Mining Associations	4	Nevada Mining Association Colorado Mining Association Idaho Mining Association California Mining Association
Trade Associations	1	American Mining Congress (testified at two hearings)
Private Citizens	5	Mike Wood Alvin W. Gerhardt D. W. Jaquays Jim Rouse Roy Goodman
Consultants	6	The Gradient Corporation TRC Environmental Consultants Company Hydro-Search Inc. Dames & Moore Steffen, Robertson & Kirsten Southwest Environmental Service
Citizens Groups	3	Green Valley Community Coordinating Council League of Women Voters (Arizona) American Association of Retired Persons (Arizona)
Environmental Groups	2	Manasota - 88 Santo Tomas Awareness Group
Mining Companies	11	ASARCO, Inc. Newmont Mining Corporation Kennecott Copper Corporation Kaiser Aluminum & Chemical Corporation Homestake Mining Company NERCO Minerals Company St. Joe Minerals Corporation FMC Corporation AMAX Corporation Sunshine Mining Company Monsanto Chemical Company

A complete listing of all written comments, including representing counsel and appendicies, can be found in the Index of this summary report.

All submitted comments and hearing transcripts are in the EPA docket room listed under the prefix MWRC (Mine Waste Report to Congress). They are numerically ordered 001- 060 plus L001 and L002 (late).

2. LEGAL/PROCEDURAL

2.0 OVERVIEW

Many of the comments summarized in this chapter address what respondents believed to be either legal or procedural deficiencies in the Report to Congress. Quite a few respondents noted that the Report did not fully cover all aspects of what they felt Congress had intended to be a detailed and comprehensive study. Others suggested that the Report should have addressed wastes associated with the processing of ores and minerals. In expressing these comments, many felt that there was a body of knowledge and expertise in other Federal and state agencies which could have contributed more fully to the Report, resulting in a more comprehensive study.

Several companies and organizations expressed their belief that the Report favored the need for regulation of the mining industry even though the Report's own data did not support, in the commenters opinion, the conclusion that regulation is warranted.

In defense of the EPA (but in criticism of the Report) a few respondents believed that if the Report had been more comprehensive, it would have determined that mine wastes caused sufficient adverse effects on the environment to warrant some regulation. The majority of those who responded, however, felt that neither the Report nor the real world data justified a determination by the EPA to regulate, at least at this time.

2.1 REPORT DID NOT FULFILL CONGRESSIONAL MANDATE FOR A COMPREHENSIVE STUDY

Summary of Comments

Several of those who commented on the Report criticized EPA for not conducting a "detailed and comprehensive" study. They argued that the Report did not fulfill the Congressional mandate for such a study under the requirements of Sections 8002 (f) and (p) of RCRA.

The respondents believed that EPA has a statutory prerequisite to first publish a complete and exhaustive report before they proceed to make a determination that any portion of the mining industry be subject to regulation under Subtitle C. They argued that failing to satisfy these statutory criteria and provide a basis for regulation (harm to public health and the environment) EPA cannot, by law, make a regulatory determination at this time.

It was believed by some that the Report admitted a lack of documentation and quantitative appraisal. According to these commenters, the Report's executive summary and main body provided numerous examples of a need for further and more comprehensive studies. This, commenters argued, was evidence that Congressional intent was not met.

Many specific examples were provided by commenters as to where the Report failed in its obligation to be detailed and comprehensive. The most common theme supporting this thesis was that the Report, contrary to provisions of RCRA, was not based on present-day or real world mining practices. One commenter (St. Joe Minerals Corporation) traced through the legislative history of RCRA and the Bevill Amendment by quoting from several Congressional Representatives, and concluded by saying:

> "It is obvious by these statements that Congress did not contemplate a mining waste study based on tests that are not applicable to the real world; but instead was cognizant of the unique nature of mining disposal practices and wanted to know whether these wastes are hazardous in the real world." (St. Joe Minerals Corporation, p. 8.4)

The American Mining Congress also supported this viewpoint by observing that if Congress had sought a simple overlaying of hazardous waste "characteristics" upon the industry they would not have enacted Section 8002(f). Instead, the American Mining Congress continued, Congress could have remained silent and thereby allowed EPA to treat the mining industry's wastes in the same manner as any other industrial wastes.

To summarize other submitted responses as to why, in their opinion, the Report failed to meet the mandate for being detailed and comprehensive, the following examples are given:

- Most of the 12,000 nonmetal mines were set aside for later study. While this was appropriate because these clay and non-metallic waste streams seldom pose a hazard to the environment, EPA should not regulate these and other wastes until doing a complete study. (Kaiser Aluminum & Chemical Corporation)

- The required analysis of alternative control measures is almost non-existent and falls short of Congress' mandate. (The Fertilizer Institute)

- The Report was not comprehensive because it failed to adequately address smelter and refinery wastes, inactive and abandoned mines, economic impacts, costs of compliance, high volume low-toxicity wastes, and some mineral industry segments as phosphate rock, uranium overburden and oil shale. (U.S. Bureau of Mines)

- Scientifically sound data from other Federal and State agencies was not included in the Report. (H.F. Magnuson Company)

- The Report did not fulfill its primary purpose and thereby failed to determine whether public health or the environment was being harmed through exposure to mining wastes. (Kennecott Copper Corporation)

- EPA addressed the present mining disposal and utilization practices in only a general fashion and did not relate these practices to present conditions. (Coeur Exploration, Inc.)

- The Report did not conduct a study on air pollution caused by dust as required in Section 8002 (f) (3) of the Act. (Sunshine Mining Company)

- Refining of bauxite to alumina and the reduction of alumina to aluminum (including spent potliners and red and brown muds) were not included within the scope of the Report. (Kaiser Aluminum & Chemical Corporation)

Finally, some respondents criticized the Agency's allowance of only six months to complete supplementary studies of existing data. Several commenters (for example, NERCO Minerals Company and the State of Montana Department of State Lands) suggested that the June 30, 1986 deadline for EPA's final determination of a regulatory strategy did not allow enough time for much needed background investigations and risk assessments.

Recommendations

The recommendation most often suggested was for the EPA not to consider making a regulatory determination regarding the mining industry until the complete intent of Congress is satisfied for a "detailed and comprehensive study." Most commenters agreed that additional studies, analyses and risk assessments were necessary on the part of the EPA.

Opposing Viewpoint

The Green Valley Community Coordinating Council, Inc. also believed that the Report did not conduct a detailed and comprehensive study into a wide variety of environmental, technical, and economic issues. However, in their Tucson public testimony, they argued that adverse effects from mining waste would be discovered if the EPA were to more fully address overburden, copper sulfide tailings, and acidic leachates.

While this in not an opposing viewpoint in the technical sense, it does originate from a respondent who wished to see the EPA come to a different conclusion from those summarized earlier.

References Summarized

St. Joe Minerals Corporation (014); pp. 5.1-5.2, 8.4-8.5.

Sunshine Mining Company (021); p. 4.

The Fertilizer Institute (023); pp. 7, 9-10.

Kennecott Copper Corporation (028A); pp. 4-5.

United States Department of the Interior, Bureau of Mines (030); p. 3.

Kaiser Aluminum & Chemical Corp.
(Vorys, Sater, Seymore and Pease) (031); pp. 3-5.

Steven R. Murray (041); p. 1.

American Mining Congress (046); p. 8.

Coeur Explorations, Inc. (049); p. 1.

H.F. Magnuson Company (053); p. 1.

Duval Corporation (055); p. 3.

Green Valley Community Coordinating Group (Public Testimony - Tucson (T1)); p. 9.

Arizona Department of Health Services, Office of Waste and Water Quality Management (Public Testimony - Tucson (T12)); p. 1.

Kennecott Copper Corporation (Public Testimony - Washington (W2)); p. 19.

Kaiser Aluminum & Chemical Corp (Public Testimony - Washington (W3)); pp. 31-32.

2.2 REPORT DID NOT ADDRESS PROCESSING WASTE

Summary of Comments

In addition to the deficiencies vis-a-vis the statutory mandate described in Section 2.1, 18 respondents stated that the Report was incomplete because it failed to address and study wastes associated with the processing of ores and minerals.

Some believed that this was a statutory short-cut (not to study the processing of ores and minerals) and was done by the EPA to meet the court-imposed deadline. They commented that this attempt to curtail the scope

of the Report, whether through lack of resources or time, was not a sufficient basis for the Agency to, in their opinion, effectively rewrite the statue.

Phelps Dodge Corporation and Newmont Services, Ltd. commented that EPA's reason for omitting processing wastes based on their October 2, 1985 reinterpretation (precluding the need because they are no longer special study wastes) was "indefensible." (Newmont Services Ltd., p. 3) They pointed out that the reinterpretation is, at this point in time, only an EPA proposal and a controversial one at best. They concluded by saying that:

> "The reinterpretation therefore has no more legal force than other proposed regulation and cannot be used as justification for leaving processing wastes out of the study. This is especially true since the actual studies of processing wastes which should have been conducted would have been done years prior to the October 1985 proposal." (Newmont Services Ltd., p. 3)

Phelps Dodge Corporation stated that EPA's offer to not regulate the remaining processing wastes until a separate report is prepared and submitted to Congress was groundless. They argued that there is no authority in RCRA for EPA to conduct a separate study and make a separate report solely for processing wastes.

It was commented that the Congressional intention for EPA to study real world practices was thwarted by the exclusion of processing wastes. For example, as one company argued, the co-disposal of milling wastes (tailings) and processing wastes (acid plant blowdown) was not addressed because the Report excluded processing wastes from its scope. The commenter emphasized that Congress intended for EPA to look at options of co-disposal and to either confirm or refute the belief that this was environmentally sound. The company believed that the Report's failure to study processing wastes, and thereby real world practices, constituted an administrative convenience instead of meeting statutory requirements.

One commenter (Kaiser Aluminum & Chemical Corporation) referenced the legislative history of RCRA and the later amendments. They too concluded that EPA's reinterpretation of the 1980 Bevill Amendment resulting in the exclusion of processing wastes (except large volume wastes) was in direct contravention to the clear congressional directive. They pointed out that the interrelationship between the RCRA exclusion provision in Section 3001 (b) (3) (A) and the corresponding study obligations of Sections 8002 (f) and (p) was "simple." Those wastes exempt under the first section (3001 (b) (3) (A)) must be studied under the later sections (8002(f) and (p)) before a regulatory determination is made. In both instances, Kaiser argued, the universe of wastes is identical and does not allow the setting aside of a class of wastes prior to a regulation decision.

The American Mining Congress emphasized that Congress' intent to have EPA study all wastes was clearly articulated in Section 8002 (p); and further,

that this Congressional intent "... was a conscious and deliberate rejection of EPA's premature attempts to regulate such wastes." (American Mining Congress, p. 12)

Some believed that EPA had invited regulatory confusion by arbitrarily distinguishing among extraction, beneficiation, and processing. They felt this was further confused by the attempt to distinguish between large volume and other processing wastes in the reinterpretation. The question was left open as two companies (Unocal Corporation and Rocky Mountain Oil & Gas Assoc.) asked the EPA to identify which wastes fall under the processing designation (i.e., at what point does beneficiation end and processing begin?).

Phelps Dodge Corporation pointed out that, according to the principle of statutory reenactment, when Congress in 1984 adopted Section 3004 (x), it was presumed that they intended the language to have the same meaning as EPA's longstanding interpretation. As a result, Phelps Dodge Corporation argued that Section 3004 (x) applies to smelting and refining wastes as well as to all other solid wastes from the processing of ores and minerals. Kaiser Aluminum & Chemical Corporation continued in this vein by noting that:

> "[In] limiting the scope of its Report to Congress to only 'extraction' and 'beneficiation' wastes (and construing these terms in the narrowest manner possible), EPA has tacitly and arbitrarily removed many of the wastestreams from bauxite refining and primary aluminum reduction from the relative protections which are to be afforded by Section 3004 (x) of RCRA for these wastes." (Kaiser Aluminum & Chemical Corporation (009), p. 12)

Recommendations

Most respondents believed that all processing wastes subject to the Bevill mining waste exclusion should be given proper consideration under Section 3004(x).

Others also recommended that no regulatory determination be made until the EPA has complied with the full mandate of Congress and submitted a complete Report to Congress which includes a study of ore processing wastes.

References Summarized

Newmont Services Ltd. (006); p. 3.

FMC Corporation (Holland & Hart) (008); pp. 5-6, 17.

Kaiser Aluminum & Chemical Corporation,
Aluminum Division (Robinson & McElwee) (009); pp. 5-6, 8, 10-13.

Phelps Dodge Corporation (Evans, Kitchel & Jenckes) (010); pp. 2-3.

Homestake Mining Company (017); P. 1.

ASARCO Incorporated (019); p. 9.

FRM Minerals, Inc. (025); p. 1.

NERCO Minerals Company (033); p. 4.

Monsanto Chemical Company (037); p. 1, 2.

Reynolds Aluminum (039); pp. 1-2.

Ventures Trident (042); p. 2.

American Mining Congress (046); pp. 1, 12.

Rocky Mountain Oil & Gas Association, Committee on Oil Shale (057); p. 2.

Duval Corporation (055); p. 3.

Unocal Corporation (058); p. 2.

ASARCO Incorporated (Public Testimony - Tucson (T2)); p. 18.

Kaiser Aluminum & Chemical Corporation (Public Testimony - Washington (W3)); pp. 29-30.

Homestake Mining Company and Nevada Mining Association (Public Testimony - Washington (W7)); pp. 59-60.

Colorado Mining Association (Public Testimony - Denver (D1)); p. 7.

2.3 REPORT FAILED TO USE EXPERTISE OF OTHER FEDERAL AND STATE AGENCIES

Summary of Comments

The comment was made that the EPA, in writing the Report, did not examine the pervasive regulatory system of other Federal and state agencies or other branches within the EPA itself. Some believed this was a major flaw in the Report.

Comments were made that the EPA, in making the decision not to evaluate the existing regulatory framework for the mining industry, failed to carry out a requirement of Section 8002 (f) of RCRA. This section, it was stated, calls for the Report to Congress to consider the "adequacy of means and measures currently employed by the mining industry, Government agencies, and others" to

avoid duplication and to expedite the study. It was reported that this same section (8002 (f)) told the EPA to include in their Report "appropriate findings and recommendations for Federal and non-Federal actions concerning such effects." The American Mining Congress added:

> "These congressional instructions amount to an admonition to EPA not to proceed alone in performing the study. While EPA bears responsibility for conducting an appropriate study and issuing a report, the Agency clearly must utilize the knowledge and expertise of other federal agencies, states, industry and others to carry out its responsibilities properly." (American Mining Congress, p. 9)

Several respondents observed specifically that the Bureau of Mines and the Forest Service were not consulted by the EPA during the study. Sunshine Mining Company further commented that Section 8002 (f) called for input from the Secretary of the Interior who, they stated, has expressed displeasure over his limited input to the Report.

In a related matter, the American Mining Congress noted that EPA's determination in June, 1986 regarding whether or not to regulate the mining industry must be based on studies and reports that have been available for public review and comment. They observed that EPA has apparently engaged contractors to gather additional data and make further studies in support of the regulatory determination. It was their opinion that these data and reports, by statute, must be made available to the public for review and comment prior to any determination based on them.

Recommendations

In summary, several commenters recommended that the EPA not undertake any new Federal regulation of the mining industry until they carefully examine the adequacy of existing state regulatory programs. They also urged active participation by both the appropriate regulatory agencies and the mining industry.

The Tennessee Valley Authority suggested that if the EPA decides to study uranium overburden further, they would find data available from the States of Wyoming and New Mexico that should be helpful in making a regulatory determination.

References Summarized

Northwest Mining Association (015); p. 4.

Sunshine Mining Company (021); p. 5.

Steven R. Murray (041); p. 1-2.

Tennessee Valley Authority (029); p. 2.

H.F. Magnuson Company (053); p. 1.

American Mining Congress (046); pp. 8-9, 15, 20, 39, 120.

Rocky Mountain Oil & Gas Association, Inc., Committee On Oil Shale (057); p. 1.

Colorado Mining Association (Public Testimony - Denver (D1)); p. 6.

J.R. Simplot Minerals, Chemical Division (Public Testimony - Denver (D15)); p. 151.

2.4 REPORT CONCLUSIONS ARE INCONSISTENT WITH SUPPORTING DATA AND ANALYSES

Summary of Comments

Nine commenters felt that EPA had demonstrated a predisposition to regulate the industry in spite of some of the evidence it cited in the Report. For example, Newmont Services Ltd. believed that the EPA, by its choice of what to study and what not to study, designed a document that can be used to support regulation of mine waste as hazardous under Subtitle C of RCRA. Others felt that by using inappropriate tests (such as E.P. toxicity, corrosivity, and cyanide), which the Report admits are not entirely appropriate, the Agency is exposing itself to the criticism that it is looking for data to support its predilection for regulation.

A few examples of the type of comments received which supported this point of view are presented below.

- The section on tailings dams did not accurately relate an unbiased opinion on dam stability. (Nevada Mining Association)
- It appeared that EPA has intentionally "biased" its test procedure in order to artificially overestimate the volume of wastes which might exhibit the characteristics of EP toxicity. (St. Joe Minerals)
- Data or information in the body of the Report which supported a conclusion that regulation was unnecessary was not included or referenced in either the Executive Summary or the Conclusions and Recommendations. (Newmont Services Ltd.)

- The Report and the proposed reinterpretation, when read together, indicated an intention by the EPA not to comply with the statutory directive to study all wastes prior to regulation. (FMC Corporation)

- Conclusions reached in the Report and issues raised by low level radiation compel a determination that radiation regulation of phosphate under RCRA is unwarranted. Yet EPA seemed to suggest that it was engaged in a "cynical end-run of the congressionally mandated procedures" by not complying with the study and reporting requirements of 3001 of RCRA. (The Fertilizer Institute)

Opposing Viewpoint

The Arizona Department of Health Services commented that they felt the Report conclusion in 6.2.4.4 which stated that there were mixed results regarding contamination was "erroneous." It stated that the Report itself contradicts this conclusion by describing in the text documented occurrences of ground water and surface water contamination in Arizona and elsewhere.

References Summarized

Newmont Services Ltd. (006); p. 8-9.

FMC Corporation (Holland & Hart) (008); p. 16-17.

St. Joe Minerals Corporation (014); p. 5.11-5.12.

Nevada Mining Association (022); p. 7.

The Fertilizer Institute (023); p. 17-18.

David Paul Parker (026); p. 1.

Victor Kollock (035); p. 1.

American Mining Congress (046); pp. 14.

H.F. Magnuson Company (053); p. 1.

Arizona Department of Health Services, Office of Waste Water Quality Management (Public Testimony - Tucson (T12)); p. 2.

3. TECHNICAL

3.0 OVERVIEW

Many commenters stated that the tenor of the Report suggested that there is a substantial threat to human health from mine wastes but that, in general, this conclusion was not supported by the technical evidence. In particular many argued that the damage cases discussed in the Report did not have sufficient documentation to conclude that there is a danger to the environment and to human health.

Commenters argued that the supporting evidence of damage and health effects was weak because the Report failed to adequately distinguish between past and current mining and mine waste practices, site specific characteristics were not considered, and inappropriate test methods, sampling, and criteria were used. Commenters stated that inappropriate conclusions resulted from the sampling of process streams instead of waste streams, and from extrapolating large composite samples taken from a single site to represent entire segments of the mining industry. Many commenters pointed out that an insufficient number of samples were taken over an inadequate time period and from too small a number of locations for the results to be statistically valid.

Commenters thought that there were enough flaws in the data interpretation to justify doubt about both the utility and the accuracy of the Report's conclusion that some mine wastes may pose potential risks. For this reason, nearly half of the respondents urged further study.

3.1 RISK TO HUMAN HEALTH AND THE ENVIRONMENT FROM MINE WASTE NOT DEMONSTRATED

Summary of Comments

Commenters questioned the overall conclusions of the Report with regard to the degree of hazard to human health and the environment posed by mine waste in the light of the body of evidence presented. The Bureau of Mines stated that the Report did not establish a linkage between mineral waste disposal practices and offsite health effects. One commenter wrote:

> "The tenor of the report leads one to believe that there is a substantial threat to human health. The body of the report, however, does not provide proof or documentation of any endangerment to human health from an existing mining operation. Further the report does not provide any justification for using the term 'hazardous' to describe mine wastes." (Steven R. Murray, p. 1)

Many commenters stated generally that the Report did not support the conclusion that mining and mineral processing wastes associated with active mine operations represented a threat to human health or the environment.

Four commenters highlighted the lack of evidence presented in the Report that migration of hazardous constituents at mine waste sites presents a danger to human health. Kennecott Copper Corporation pointed out that the only constituents found at levels above national secondary drinking water standards at monitoring wells at copper dump leach piles were not RCRA hazardous constituents. Rocky Mountain Energy emphasized that the Report was not clear that seepage from tailings impoundments and copper leach dumps constituted a danger to human health.

The Gradient Corporation further stated that their study, done for the American Mining Congress that physical and chemical factors (such as dilution or lack of contaminant mobility) definitely limit the potential exposure.

Many commenters pointed out that the Report found only 5 percent of mines to have hazardous materials (not withstanding the issue of the appropriateness of criteria and methodologies used to determine these to be hazardous), and none of these was found to be injurious to human health.

Phelps Dodge Corporation argued that the Report was designed to uncover the worst cases of risks to human health, and that, even with this approach, no significant human health risks were identified.

Certain commenters emphasized the Report's lack of evidence of risks from wastes associated with their own industry. J.R. Simplot Company and the Fertilizer Institute noted that the Report (pages 4-55 and 4-56) clearly demonstrated that phosphate mining wastes and mining waste control practices had no significant adverse effect on human health and the environment.

The respondents concluded by stating that mine wastes are not hazardous and that the EPA has not proven otherwise. Independent studies were cited which, in the view of the respondents, demonstrated that mining wastes rarely, if ever, posed a threat to human healh and the environment. Cyanide heap leaching and uranium overburden were mentioned as specific examples supporting this conclusion.

The State of Missouri, Department of Natural Resources pointed out that flooded mines and runoff from tailings piles provide water which is of adequate quality to serve as a drinking water source for many Missouri residences, implying that much mine waste in Missouri presents no threat to human health.

Opposing Viewpoints

In contrast to these comments, the Bureau of Indian Affairs, stated that uranium mining posed a threat to both human health and the environment, and that uranium mine wastes had contributed to poor water quality in the Little

Colorado. The State of Colorado Department of Health also stated that past mining activities had degraded streams, and that potential for impairment of human health and serious environmental degradation still existed. Green Valley Community Coordinating Council, Inc., stated that dust from Anamax's J-Dump and the Sierrita copper complex was a major environmental problem.

Two state and local agencies (The Pima Association of Governments and the Arizona Department of Health Services) commented that there are contaminants reaching the ground water from local copper mines. They believed the Report should have mentioned other constituents and substances of concern including sulfate concentrations exceeding 1,500 mg/l, total dissolved solids concentrations in excess of 2,000 mg/l, and copper in excess of 100 mg/l. They also stated that little is known about the impacts to humans and wildlife from compounds used in the processing of copper ore, such as: "xanthates, thionocarbamates, pine oil, cresylic acid, methylisobutylcarbinol, sodium sulfides, cyanides, and triethoxybutane." (Arizona Deptartment of Health, p. 2).

The Pima Association of Governments stated that studies had found evidence of seepage and aquifer recharge from the local copper mines. They commented that this recharge resulted in increased levels of sulfates, hardness, and total dissolved solids, as observed in down-gradient wells. The Pima County Health Department reported on disturbances from dust blowing off of inactive copper-mining tailings piles. They recommended the development of a strong program to prevent dust pollution and completely reclaim land to its native conditions.

References Summarized

State of Wyoming, Department of Environmental Quality (001); p. 2.

Newmont Services Ltd. (006); p. 2.

FMC Corporation (Holland & Hart) (008); pp. 7-8.

Phelps Dodge Corporation (010); pp. 5-6.

Battle Mountain Gold Company (013); pp. 5-6.

Northwest Mining Association (015); pp. 2, 7.

AMAX Inc. (016); p. 4.

Homestake Mining Company (017); p. 2.

U.S. Department of the Interior, Bureau of Indian Affairs (018); pp. 2-3.

ASARCO Incorporated (019); p. 9.

Sunshine Mining Company (021); p. 2.

Nevada Mining Association, Inc. (022); p. 9.

The Fertilizer Institute (023); pp. 15, 32.

Minerals Exploration Coalition (024); p. 1.

FRM Minerals, Inc. (025); p. 4.

Gulf and Western Industries, Inc. (028); p. 4.

Kennecott Copper Corporation (028A); p. 5.

Tennessee Valley Authority (029); p. 1.

United States Department of the Interior, Bureau of Mines (030); p. 2.

NERCO Minerals Company (033); p. 3.

Rocky Mountain Energy (038); p. 3.

Steven R. Murray (041); p. 1.

Ventures Trident (042); p.2.

Wyoming Mining Association (043); p. 1.

American Mining Congress (046); pp. 4, 19.

University of Idaho, College of Mines and Earth Resources, Deptartment of Metallurgical and Mining Engineering (047); p. 2.

J. R. Simplot Company (052); pp 1,4.

Texasgulf Minerals and Metals (056); p. 1.

State of Missouri, Department of Natural Resources (060); p. 2.

Green Valley Community Co-ordinating Council, Inc. (Public Testimony - Tucson (T1)); pp. 10-13.

Newmont Mining Corporation (Public Testimony - Tucson (T9)); p. 53.

Pima Association of Governments (Public Testimony - Tucson (T10)); p. 1.

Pima County Health Department (Public Testimony - Tucson (T11)); pp. 1-2.

Arizona Department of Health Services, Office of Waste and Water Quality Management (Public Testimony - Tucson (T12)); p. 2.

Kennecott Copper Corporation (Public Testimony - Washington (W2)); pp. 23-24.

The Gradient Corporation (Public Testimony - Washington (W5)); pp. 42-43, 47-48.

Dames & Moore (Public Testimony - Denver (D6)); p. 65.

State of Colorado, Dept. of Health (Public Testimony - Denver (D14)); p. 154.

3.2 THE DAMAGE CASES DOCUMENTED IN THE REPORT DO NOT SUPPORT A DETERMINATION THAT MINE WASTES ARE HAZARDOUS

Summary of Comments

A number of commenters examined the "20 verifiable cases of damages having substantial documentation" discussed in the Report, and broadly concluded that the cases do not meet the Congressional requirement to compile "documented cases in which danger to human health or the environment has been established" (SDWA Section 8002(p)(4)). The American Mining Congress and many others argued that:

- The damage case studies found no health effects;
- 13 of the 30 mine/mill sites studied were selected from the Superfund NPL and do not represent current mining practices;
- EPA was only able to document alleged environmental damages at 5 active sites, which represent only 1 percent of the 600 active sites in the U.S.

The University of Missouri-Rolla pointed out that when the Report cited damage case incidents in the New Lead Belt it failed to mention that the same study showed substantial recovery of receiving streams. AMAX Inc. argued in detail that "damage" documented at the Twin Buttes Mine showed that migration of sulphates was occurring only at lower levels and was occurring elsewhere in areas not affected by mining. They also emphasized that sulphate "is not truly a hazardous material" (p. 12).

References Summarized

Newmont Services Ltd. (006); pp. 5-6.

FMC Corporation (Holland & Hart) (008); pp. 3-4.

Phelps Dodge Corporation (010); p.7.

AMAX Inc. (016); pp. 8-13.

ASARCO Incorporated (019); p. 14.

Kennecott Copper Corporation (028A); p. 6.

University of Missouri-Rolla, Environmental Research Center (040); p. 1.

Steven R. Murray (041); p. 3.

American Mining Congress (046); pp. 24, 36-37, 119-120.

Duval Corporation (055); p. 4.

Jim Rouse (Public Testimony - Denver (D13)); p. 132.

3.3 THE REPORT FAILED TO ADEQUATELY DISTINGUISH BETWEEN PAST AND CURRENT MINE WASTE MANAGEMENT PRACTICES

Many commenters stated that, in their opinion, the Report failed to adequately distinguish between current and past mine waste management practices. Commenters noted that the limited environmental effects identified by the Report were generally associated with historical waste control practices that were no longer in use.

The Colorado Mining Association argued that the Report did not indicate whether there were major health risks associated with current mining practices. The FMC Corporation argued that it was inappropriate to use evidence from inactive and abandoned Superfund sites to justify RCRA regulations.

One respondent stated that the Report's analysis of the control program in the phosphate industry was "grossly misleading" because it confused active and inactive sites. Another commenter observed:

> "It is a fact that waste disposal and pollution control practices currently in place at modern mining operations serve to preclude or mitigate potential environmental impacts." (Rocky Mountain Energy; p.3.)

The Bureau of Mines stressed the need to differentiate regulatory requirements for abandoned/older operations from new mining operations:

> "We foresee a need not only for a separate program for abandoned sites, but also for transitional programs for those industry segments using older technologies.... Clarification of the nature of the linkage between the management of accumulated waste and the permitting of continued operations is also needed." (United States Department of the Interior, Bureau of Mines p. 2)

Lacana Mining Inc. stated that abandoned mines should be dealt with under Superfund.

Opposing Viewpoint

The Bureau of Indian Affairs asserted that the Report failed to recognize the magnitude of the problems associated with abandoned uranium mines, and was therefore deficient in its study of these wastes.

References Summarized

Lacana Mining Inc. (007); p. 3.

FMC Corporation (Holland & Hart) (008); p. 8.

St. Joe Minerals Corporation (014); pp. 1.2, 2.1.

U.S. Department of the Interior, Bureau of Indian Affairs (018); p.1.

ASARCO Incorporated (019); p. 14.

The Fertilizer Institute (023); p. 7.

FRM Minerals Inc. (025); p. 2.

U.S. Department of the Interior, Bureau of Mines (030); p. 2.

NERCO Minerals Company (033); p. 12.

Rocky Mountain Energy (038); p. 3.

University of Missouri-Rolla (040); p. 1.

Colorado Mining Association (Public Testimony - Denver (D1)); p. 6.

3.4 SITE SPECIFIC CHARACTERISTICS NOT CONSIDERED

Summary of Comments

Many commenters argued that EPA had failed to adequately consider site-specific characteristics that would significantly influence the degree of risk to human health near mining waste sites. They stressed that these site-specific conditions must be considered before any judgments are made about the relative degree of hazard posed by particular wastes.

Other commenters listed specific factors which they believed had not been adequately considered in the Report. These factors included: local and

regional geological effects on contaminant migration, such as presence and depth of aquifers, and dissipation and neutralization of acidic effluents in limestone; proximity of population; climate; background water quality (contamination or radiation levels); ore characteristics; waste volumes; beneficiation processes and reagents used; and mine technology. The Tennessee Valley Authority and State of Wyoming, Department of Environmental Quality stressed the importance of considering site-specific factors in determining risks from uranium wastes, as did The Fertilizer Institute in the context of phosphate wastes.

Green Valley Community Coordinating Council, Inc. encouraged the EPA to carefully consider relevant site-specific factors in future studies of risks posed by mine waste.

References Summarized

State of Wyoming, Department of Environmental Quality (001); p. 2.

St. Joe Minerals Corporation (014); p. 5.3.

Northwest Mining Association (015); p. 2.

Nevada Mining Association, Inc. (022); p. 4.

The Fertilizer Institute (023); p. 11.

Minerals Exploration Coalition (024); p. 2.

FRM Minerals Inc. (025); p. 2.

David Paul Parker (026); p. 1.

Tennessee Valley Authority (029); p. 2.

NERCO Minerals Company (033); p. 11.

Victor Kollock (035); p. 1.

Ventures Trident (042); p. 1.

Gold Fields Mining Corporation (045); p. 2.

Coeur Explorations Inc. (049); p. 2.

State of Missouri, Department of Natural Resources (060); p. 5.

Green Valley Community Coordinating Council Inc. (Public Testimony - Tucson (T1)); pp. 21-22.

Kennecott Copper Corporation (Public Testimony - Washington (W2)); pp. 21-22.

Homestake Mining Company (Public Testimony - Washington (W7); p. 65.

3.5 INAPPROPRIATE METHODOLOGY AND CRITERIA USED FOR DETERMINING THE HAZARD OF MINE WASTE

Summary of Comments

This single topic drew the greatest number of comments from all the responses received (47 of 61 respondents). The general trend of the comments was that the criteria applied in the Report were not applicable to mining wastes because: tests designed for liquids were applied to solids with no supporting justification; background values of contaminants, which are usually higher than drinking water standards because of the juxtaposition of the ore body, were not considered; and environments that are representative of mining were not considered.

Many believed the Report only dealt with the technical indicators of hazard and did not address contaminant behavior in real environments or the presence or absence of exposure pathways in real situations. The lack of health effects, many observed, was possibly due to the fact that exposures do not occur.

The commenters believed that the criteria used to advance the conclusions were vague and were not supported by the body of data presented, and that a more accurate waste classification system must be developed.

The E.P. Toxicity Test received more comments than did other analytical tests. Eighteen commenters pointed out that this test was developed to simulate sanitary landfill conditions where large quantities of organics were present and was inappropriate for use with mining wastes. In many cases and especially for lead wastes, acetic acid was the most aggressive solute, and overstated the availability of metals.

Commenters felt that leachability should be considered on a site-specific basis where the leachate considered was actually one likely to occur, such as rainwater or deionized water. The Report, commenters concluded, did not address the fact that deionized water was more representative of environmental conditions than acetic acid. It was also felt that the lack of data on metal attenuation during ground-water migration prevented accurate qualification of environmental impacts. This was demonstrated, some commented, by the field data that indicated metals do not migrate over long distances.

The Corrosivity Test as applied in the Report, reviewers pointed out, did not take into account the effect soils and rock would have on the final pH of the fluid. The Report indicated that only a very few samples (3 percent) were found to be corrosive and of these at least one sample was taken from a process stream that should not have been considered waste. Several commenters pointed out that the corrosivity test was designed for liquids and that it should not have been applied to solids as was the case in the Report.

Acid Forming Potential is site specific, many commenters asserted, and was improperly evaluated in the Report where factors such as buffering capacity of soils and rocks were not considered. Also, the acid forming

potential of the waste rock may be entirely different than that of the ore. It was stated that the acid forming potential used in the Report was projected and not based on actual test data making it a worst case scenario. Both St. Joe Minerals Corporation and Kennecott Copper Corporation thus supported the Report's conclusion that current information is insufficient to establish any threat to public health or the environment as a result of acid formation in tailings.

For Cyanide the primary concerns were: that the evaluation did not recognize that different cyanide complexes have different solubilities, stabilities, and toxicities; and that cyanide is not generally persistent in the environment. Commenters stressed that the Report overlooked the reactivity of cyanide in the environment and the difficulty of chemically analyzing for total cyanide. Because of the lack of technical information contained in the Report, two mining companies supplied conference proceedings on the behavior of cyanide in the environment.

Commenters felt that there is no real adverse effect to human health or the environment that can be attributed to the cyanide content of flotation tailings. Even though free cyanide is extremely toxic, commenters stated that the industry has developed an excellent safety record with regard to handling cyanide wastes. Battle Mountain Gold Company commented that the factor of 50 times the ambient water quality criterion for cyanide was considered to be "low" as compared to the factor of 100 that was used for metals. Also Coeur - Thunder Mountain, Inc., stated that testing indicates that spent ore and process solutions can be treated to the drinking water standard for cyanide.

Commenters argued that the Report erroneously equated material in process streams, such as cyanide solutions, with mining wastes. Therefore many commenters believed that without monitoring data to support the conclusion that precious metal wastes are hazardous, the EPA had decided to regulate first and investigate later.

The topic of Radioactivity provoked many comments. Many believed that the application of a Subtitle C radiation standard was inappropriate because radium, the indicator of contamination, can come from in-place uranium. Some commented that the Report was deficient in its consideration of radioactivity because local background radiation was not considered. This approach, many commenters suggested, does not accurately reflect the state of scientific knowledge, and the EPA has failed to produce a finding that there is significant risk from radiation from wastes in the mining industry.

Other comments were that many uranium mines are in remote locations where exposure potential is very low. This position was further supported by Rocky Mountain Energy's data on atmospheric radon measurements that showed no evidence of hazard. It was also felt that mine overburden does not present a potential hazard, and that the true hazard could only be evaluated through risk assessments.

The Solubility of metals and metal compounds, it was stated, is low and concentrations of concern are not found in solutions migrating from tailings. In the cases of phosphate overburden waste, it was stressed that uranium and

radium are "locked up" in the mineral apatite which has a very low solubility, making these radionuclides largely unavailable for transport by ground water. Commenters observed that the low solubility of metals, combined with their attenuation by soils and rocks, yields little migration of metals in ground water.

Asbestos release by air emissions from asbestos disposal, mining, and milling are already regulated, it was pointed out, under 40 CFR 61 and 40 CFR 440. Commenters stated that the potential hazard from asbestos wastes is through airborne exposure, and EPA studies demonstrate that asbestos fibers do not leach through soil. Reviewers believed the Report used outdated and inaccurate data in that the health effects of asbestos exposure from mine wastes did not represent an objective review of current literature. The comment was made that the word asbestos as used in the law is a generic term for a large group of minerals that are not equally hazardous or carcinogenic.

Other comments regarding inappropriate methodology and criteria were:

- The Report ignored the distinction between phosphate wastes and other mining wastes;
- Because of the lack of health effects and the variability of standards for aesthetics, it is inappropriate to consider regulation of sulfate in ground water; and
- Even though total dissolved solids (TDS) may serve to indicate contaminantion, it should not be considered a contaminant until far in excess of its secondary drinking water standards limit.

Recommendations

Recommendations were made in the areas of the E.P. toxicity test, corrosivity, acid forming potential, cyanide, and radioactivity as follows:

- There is a need to develop a more accurate waste classification system that is based on an acid/base determination of the waste's potential for mobilizing metals;
- A suitable test for determining the corrosivity of solids needs to be developed;
- More appropriate procedures for the determination of acid forming potential need to be developed;
- More study is needed on the use and fate of cyanide species and complexes at typical mining and beneficiation operations;

- The EPA must make a distinction between the potential for harm from total and from free cyanide before a clear picture of the hazard can be seen; and

- Site specific risk assessments of radiation emissions should be used in developing regulations.

Opposing Viewpoint

Opposing views were presented in the following areas:

- It was recommended by Manasota - 88 that the present cleanup standard of 5pCi/g of radium-226 be applied under RCRA.

- The South Dakota Department of Water and Natural Resources supported the regulation of heap leach operations for precious metals by RCRA.

- The Pima Association of Governments made the observation that acetic acid was inappropriate for the E.P toxicity test. They stated that because heap leaching activities use sulfuric acid which, they said, has a greater leaching ability, the evaluation of the fate of by-products should focus on the sulfuric acid leaching criterion, and not acetic acid extraction information.

References Summarized

Superior Mining Company (002); pp. 1, 3.

South Dakota Department of Water and Natural Resources (L002); p. 1.

Placer, U.S. Inc. (003); pp. 2-3, 4.

Newmont Services Ltd. (006); pp. 5, 7, 8, 10, 11, 14.

FMC Corporation (Holland and Hart) (008); pp. 9, 11-13.

Phelps Dodge Corporation (Evans, Kitchel & Jenckes) (010); p. 7.

James M. Montgomery, Consulting Engineers, Inc. (011); p. 3.

Coeur-Thunder Mountain, Inc. (012); p. 2.

Battle Mountain Gold Company (013); pp. 2-4.

St. Joe Minerals Corporation (014); pp. 4.2, 4.3, 5.21, 5.23, 5.24, 5.33-5.35, 5.38, 5.41, 5.47, 5.48, 5.51, 5.52.

Northwest Mining Association (015); pp. 3, 4.

AMAX Inc. (016); pp. 3, 5-8, 14.

Homestake Mining Company (017); p. 2.

ASARCO Incorporated (019); pp. 8, 19.

Sunshine Mining Company (021); pp. 1, 2.

Nevada Mining Association (022); pp. 5, 6, 8.

The Fertilizer Institute (023); pp. 10, 27-29.

Minerals Exploration Coalition (024); pp. 1,5.

Gulf & Western Industries, Inc. (Prather, Seeger, Doolittle & Farmer) (028); p. 4.

Kennecott Copper Corporation (028A); p. 10.

NERCO Minerals Company (033); pp. 4-7, 9.

Hecla Mining Company (036); p. 3.

Monsanto Chemical Company (037); p.2.

Rocky Mountain Energy (038); pp. 5, 6, 26, 27.

University of Missouri - Rolla (040); p. 1.

Steven R. Murray (041); p. 1.

Gold Fields Mining Corporation (045); pp. 2-4.

American Mining Congress (046); pp. 25, 26, 32, 64, 66-68, 82, 84, 91.

Brush Wellman, Inc. (048); p. 2.

Coeur Explorations, Inc. (049); pp. 2, 3.

Alaska Miners Association (050); pp. 2, 3.

J. R. Simplot Company (052); pp. 1, 3.

Asbestos Information Association (054); pp. 3, 4, 8, 9, 11.

Texasgulf Minerals (056); p. 2.

Rocky Mountain Oil & Gas Association, Inc. Committee on Oil Shale, (057); pp. 2, 3.

Unocal Corporation (058); pp. 2-4.

State of Missouri, Department of Natural Resources (060); p. 4.

Green Valley Community Coordinating Council, Inc. (Public Testimony - Tucson (T1)); pp. 14, 15.

ASARCO, Incorporated (Public Testimony - Tucson (T2)); p. 23.

Alvin W. Gerhardt (Public Testimony - Tucson (T4)); p. 38.

Southwest Environmental Service (Public Testimony - Tucson (T7)); p. 47.

Newmont Mining Corporation (Public Testimony - Tucson (T9)); p. 54.

Pima Association of Governments (Public Testimony - Tucson (T10)); pp. 1-2.

Manasota - 88 (Public Testimony - Washington (W1,); p. 14.

The Gradient Corporation (Public Testimony - Washington (W5)); p. 43.

Homestake Mining Company (Public Testimony - Washington (W7)); p. 64.

Jim Rouse (Public Testimony - Denver (D-13); pp. 133, 136, 137.

California Mining Association and Steffen, Robertson & Kirsten (Public Testimony - Denver (D15)); p. 148.

3.6 INCORRECT DISTINCTION BETWEEN WASTE STREAMS AND PROCESS WATERS

Summary of Comments

Numerous mining companies pointed out that leach dumps will eventually become waste when the leachate no longer carries economically recoverable quantities of metal. These companies believed that heap and dump leaching operations are mineral processing systems recovering valuable metals from subgrade ore materials and only the resulting residues should be considered wastes. Kaiser Aluminum & Chemical Corporation emphasized the importance of EPA adhering to an interpretation that solvents and other substances used in mining, beneficiation, and processing are integral with the processes employed, and as such, the waste stream generated falls under the Bevill Amendment.

Several commenters found that the EPA had sampled process streams and termed them waste. The comments were as follows:

- FMC Corporation and NERCO Minerals Company commented that tests for cyanide should focus on waste materials left after leaching and not on process streams during the leaching procedure.

- Newmont Mining Corporation and Jim Rouse pointed out that at least one sample which exhibited the characteristics of corrosivity was taken from a pregnant leach solution and was not waste.

- Superior Mining Company stated that the Report's conclusion that waste from gold and silver recovery and heap leach operations may be potential candidates for listing is based on sampling process streams and not waste streams.

Many strongly believed that the conclusions of environmental and health impact studies must be based on the remaining waste and not on process streams. If RCRA does apply to these operations, then extensive study of leaching operations and their potential for environmental and health impacts must be made, it was argued.

Several stressed that the Report failed to address the existing regulatory framework for cyanide processing facilities, and failed to recognize that seepage to ground water from leaching operations is covered by the Clean Water Act. These commenters stated that the Report also overlooked the fact that integrated operations often achieve environmental benefits by comingling of wastes such as using the buffering capacity of tailings to neutralize acid plant blowdown.

Recommendations

Commenters universally recommended that process streams not be considered as, or confused with, waste streams.

References Summarized

Superior Mining Company (002); pp. 1, 2.

Newmont Services Ltd. (006); pp. 2, 6, 7, 10, 13.

FMC Corporation (Holland and Hart) (008); p. 12.

Phelps Dodge Corporation (Evans, Kitchel, & Jenckes) (010); pp. 4, 5.

James M. Montgomery, Consulting Engineers, Inc. (011); p. 4.

Nevada Mining Association, Inc. (022); pp. 4, 5, 7, 8.

Kennecott Copper Corporation (028A); pp. 10-13.

U.S. Department of the Interior, Bureau of Mines (030); p. 2.

Kaiser Aluminum & Chemical Corporation, Industrial Chemical Division and Harshaw/Filtrol Partnership (031); pp. 9-11.

NERCO Minerals Company (033); p. 6.

Newmont Mining Corporation (Public Testimony - Tucson (T9)); p. 55.

Dames & Moore (Public Testimony - Denver (D6)); p. 61.

Jim Rouse (Public Testimony - Denver (D13)); p. 132.

3.7 SAMPLING ERRORS

Summary of Comments

Many commenters believed the number of samples collected and analyzed was not adequate to serve as a basis for regulation of such a large and diverse industry because samples were taken at only one site of a particular industry segment and extrapolated to the rest of that segment. They also commented that many of the sites' samples are not representative of practices and processes currently used, and that the Report admited that sampling concentrated on areas where obvious hazards existed. Commenters objected that waste characterizations were often based on the analysis of a single composite sample with no recognition that these characteristics vary in time and space. It was stated this approach biased the sampling and the results.

It was suggested that the ground-water monitoring results were flawed in that: only eight sites were considered; seasonal variations were ignored; wells were in poor locations; and background conditions were not considered. Additionally, there were objections on the basis that in most cases sampling procedures were not specified and replicate samples were not taken.

Respondents observed that if any sample failed a particular hazard test then all of the waste from that operation failed. This tended to exaggerate the potential hazard. This approach was not rigorous, it was commented, and a complete risk assessment of the mining industry is necessary to determine whether inclusion of mining wastes under RCRA is warranted.

Other specific comments regarding sampling errors were as follows:

- The EPA/PEDCo study had no statistical validity because of the lack of replicate sampling in time and space;

- The overall impact on surface water in the PEDCo study should have been minimal because the release was to an intermittent stream;

- Test results on ores were extended to overburden without sampling or justification;

- The buffering effects of alkaline materials mixed in tailings were overlooked;

- Newmont Services Ltd. believed that the bulk of the data presented was reasonably accurate, but it was clear that EPA had ignored or misinterpreted many of these data;

- Samples taken at Brush Wellman's mine and mill facility in Utah were not representative of the actual concentrations of radium-226 present; and

- EPA extrapolated sampling results to be used as rough estimates since the sampling methodology was not statistically significant. However these rough estimates then led to projections that greater than one half of the mining waste would be considered hazardous. This population of waste apparently includes overburden, dirt and rock from mines where their operations, in fact, do not change this material. (American Mining Congress)

Opposing Viewpoint

Manasota-88 indicated that EPA should have made a distinction between the radionuclide content at mines in north and central Florida. Also, they pointed out that the issue of priority pollutants left in overburden and tailings was not addressed in the Report.

References Summarized

Superior Mining (002); pp. 1, 2.

Placer, U.S. Inc. (003); pp. 3,4.

Newmont Services Ltd. (006); pp. 2, 4, 5, 12.

FMC Corporation (Holland and Hart) (008); p. 8.

Phelps Dodge Corporation (Evans, Kitchel, & Jenckes) (010); pp. 6, 7.

St. Joe Minerals Corporation (014); pp. 5.4, 5.5, 5.7, 5.8, 5.13.

ASARCO Incorporated (019); p. 9.

Sunshine Mining Company (021); p. 4.

Minerals Exploration Coalition (024); p. 2.

FRM Minerals, Inc. (025); p. 3.

David Paul Parker (026); p. 1.

Foth & Van Dyke and Associates, Inc. (027); p. 1.

Kennecott Copper Corporation (028A); p. 6.

Tennessee Valley Authority (029); p. 1.

NERCO Minerals Company (033); pp. 10, 11.

Victor Kollock (035); p. 1.

Ventures Trident (042); pp. 1, 2.

American Mining Congress (046); pp. 27-29.

Brush Wellman, Inc. (048); pp. 1, 3.

Alaska Miners Association (050); pp. 2, 3.

Rocky Mountain Oil and Gas Association, Committee on Oil Shale, (057); pp. 1, 2.

Unocal Corporation (058); p. 2.

Manasota-88 (Public Testimony - Washington (W1)); pp. 15, 16.

Kennecott Copper Corporation (Public Testimony - Washington (W2)); p. 22.

Dames & Moore (Public Testimony - Denver (D6)); pp. 64, 65.

3.8 DATA INTERPRETATION

Summary of Comments

It was alleged that flaws in the logic of the Report cast significant doubt on both the utility and accuracy of the Report's conclusions. Some expressed the belief that the Mitre model was not useful for ranking hazards at mining sites because the score is produced largely by one factor (population) and mining and non-mining sites were scored differently.

James W. Montgomery Consulting Engineers stated that the "Stibnite Mine Project Case History" did not accurately portray the existing situation in terms of cyanide leaks and the extent of mitigation implemented at the site. They believed that this would lead the Report reader to believe that the leach pads leak and that the source of the leak has not been determined. Also Homestake Mining Company commented that throughout the PEDCo study Homestake had indicated numerous deficiencies that were never corrected in the Report.

The American Mining Congress indicated three major problems with the SCS report: (1) inaccurate data, (2) failure to distinguish between active and inactive sites, and (3) inclusion of a large number of undocumented problems. Also, in cases where independent information existed, the commenter argued, it was found that in 49 percent of the cases (done by SCS) either problems or the extent of damage had been incorrectly identified. Sunshine Mining Company commented that their old tailings pond was erroneously placed on the list of damage sites.

Commenters stated that the ground-water monitoring results were compared with drinking water standards with no consideration of the background concentrations which would be naturally high because of the presence of the ore body, regardless of mining. Concerning ground-water monitoring the following specific comments were made:

- The American Mining Congress commented that if mining facilities were introducing significant quantities of metals into the ground-water some monitoring wells certainly would have revealed it;

- The Fertilizer Institute stated that the conclusions of the Report incorrectly characterized the results of ground-water monitoring conducted by the EPA;

- The Tennessee Valley Authority did not agree with the implication that ground-water monitoring has seldom been conducted on a comprehensive basis;

- The St. Joe Minerals Corporation stated that existing monitoring data, not contained in the Report, eloquently demonstrate that transfer of E.P. toxic constituents to the ground water from lead and zinc mill tailings has not occurred.

- Newmont Services Ltd. asserted that the Report was concerned primarily with ground-water impacts from mining operations, yet there was a preoccupation with aquatic life standards and drinking water standards (Appendix C and the text). There appeared to be no scientific or technical basis for this emphasis other than to convince the reader that mine wastes pose a serious threat to aquatic life in the absence of any data.

One commenter (Jim Rouse) registered his disappointment that the EPA had not included Federally-funded contamination studies of the mining industry. He testified that the following studies should have been used in the Report:

- Bunker Hill -- No reference to 30 impoundment monitoring wells installed by the federal government;
- Grants Mineral Belt -- Only passing reference to EPA's investigations on natural attenuation;
- Florida Phosphate -- Passing reference and incorrect interpretation of data;
- Urávan Colorado -- No reference to down-gradient geochemical attenuation;
- Globe, Miami Study -- $750,000 ten-volume study only referenced by its executive summary.

References Summarized

Newmont Services Ltd. (006); pp. 10, 12, 13.

Phelps Dodge Corporation (Evans, Kitchel & Jenckes) (010); p. 7.

James M. Montgomery, Consulting Engineers, Inc. (011); pp. 3, 4.

St. Joe Minerals Corporation (014); p. 4.31.

Homestake Mining Company (017); pp. 2, 3.

ASARCO Incorporated (019); p. 10.

Sunshine Mining Company (021); pp. 4, 9.

The Fertilizer Institute (023); p. 32.

Tennessee Valley Authority (029); p. 2.

American Mining Congress (046); pp. 30, 36, 58.

The Gradient Corporation (Public Testimony - Washington (W5)); pp. 41, 42.

TRC Environmental Consultants Company (Public Testimony - Washington (W6)); p. 54.

Jim Rouse (Public Testimony - Denver (D13)); p. 130-131.

3.9 IDENTIFICATION OF THE NEED FOR FURTHER STUDY

Summary of Comments

Half of the respondents commented on the need for further study. They recommended either increased, expanded, more accurate, or prolonged EPA study of the mining waste regulation problem. The majority of the organizations which commented on the Report stressed that the mining industry is unique and diverse. They believed that accurate data on different mining wastes and regulatory schemes are therefore of utmost importance. Many respondents considered the existing data deficient for a variety of reasons, including:

- The limited scope of information studied;
- Limited sampling data;
- Inadequate statistical procedures; and
- Sampling inconsistencies.

In the opinion of several of the respondents, existing data were inadequate for developing specific conclusions regarding (1) which wastes pose significant threats to human health and the environment, (2) which operating conditions are more or less effective, and (3) which managerial systems are most appropriate for achieving the maximum degree of protection for the least possible cost. Many of the respondents consequently argued that the Agency should not base such a complex and potentially costly regulatory system on information that is insufficient and unreliable.

Recommendations

A large portion of the respondents offered suggestions regarding (1) where existing data are deficient, (2) where further study is most needed, and (3) alternative methods for assimilating and interpreting data. In general, these recommendations focused on:

- Additional sampling and analysis of waste types and streams to assess the risks posed by mining wastes;
- Additional monitoring and analysis of ground- and surface-waters;
- More thorough assessment of the efficacy and costs of alternative pollution control options;
- Determination of modified controls which might be appropriate for different categories of waste, site, and management practices; and

- More thorough investigation of the body of Federal and non-Federal regulations affecting the mining industry.

The specific waste types and streams which were suggested for further study included:

- **Clays and non-metallic wastes.**

  One respondent (Kaiser Aluminum and Chemical Corporation, Aluminum Division) expressed a need for further study of the use of deep injection wells for disposing of aqueous wastes from non-metallic operations. The respondent suggested that the Agency might be able to coordinate its ongoing work on deep well injection with further study of the mining provisions. The respondent also argued that montmorillonite clay was improperly regarded as acutely hazardous and should therefore be studied more completely.

- **Disposal of organics in tailings.**

  Two respondents (Bureau of Mines and James M. Montgomery, Consulting Engineers, Inc.) felt that the chemical composition of some tailings indicated a possibility that tailings might act as an active chemical barrier by forming relatively stable complexes.

- **Cyanide.**

  It was stated that many elements may form cyanide complexes having numerous stabilities that can vary with the metal-cyanide complex formed. Commenters noted that procedures have been developed for treating some waste ore to reduce free cyanide levels for safe disposal. One respondent (James M. Montgomery) felt that additional studies are needed to determine appropriate requirements for the treatment and disposal of cyanides. Another respondent was of the opinion that EPA must therefore conduct further study to determine what forms of cyanide are present in waste materials and streams.

- **Bauxite refining and primary aluminum reduction.**

  One respondent (Kaiser Aluminum and Chemical Corporation) felt that, in the absence of further study, the Agency may prescribe inappropriate treatment and disposal requirements because refining of bauxite

to aluminum is a unique process needing a special series of studies. They added that bauxite is currently referred to as being within the "other metals" category, when in fact, it is a highly unique mineral.

- **Disposal of Hazardous Organics.**

  One respondent (Bureau of Mines) expressed a need for further Agency study of the potential impacts from the disposal of organics such as used oil and waste chemicals in tailing ponds.

- **Radiation emissions from uranium mine materials.**

  One respondent (American Mining Congress) considered the EPA's anaysis of radon exposures from mine wastes deficient because the Report contained no quantitiative or qualitative analysis of the potential effects of radiation emissions from mine wastes. Moreover, another respondent (Wyoming Mining Association) stated that measurements taken at the site boundaries of existing uranium mining and milling operations provided strong evidence that there is no hazard to the public from radiation emissions; further study is therefore needed to resolve this problem. Finally, a commenter (NERCO Minerals Company) expressed a need for further study of phosphate rocks.

- **Chrysotile.**

  One respondent (Mike Wood) pointed out that several slightly carcinogenic substances are not considered hazardous and that chrysotile may therefore not be hazardous as defined by the Agency. He believed further study is needed of chrysotile to resolve the problem.

- **Heap and Dump Leaching.**

  Two commenters (Bureau of Mines and James Montgomery, Consulting Engineers) raised the issue of how to designate regulatory responsibility for heap and dump leaching. The commenters suggested that further study of Federal and state jurisiction over heap leach facilities is needed in order to determine how to designate responsibility for regulation.

- **Evaluation of natural attenuating effects in ore bodies.**

  Two respondents (Rocky Mountain Oil & Gas Association, Inc., and Unocal Corporation) stated that the

potential environmental impacts of mining wastes can not be adequately appraised without further study of natural attentuating effects in ore bodies.

Other recommendations for further study included:

- **More risk analyses.**

  Several respondents (Phelps Dodge Corporation, AMAX Inc., Craig Simon, Victor Kollock, Minerals Exploration Coalition, David Parker) stressed that there are a wide variety of mining practices and hydrogeologic settings. They urged that site-specific analyses are therefore necessary to determine appropriate regulatory strategies and that quantitative estimates of releases, exposures, or risks associated with various mine wastes are needed before the EPA can accurately promulgate the mining regulations. The commenters suggested that the EPA should also provide a detailed analysis of epidemiological studies on which risks are calculated and should discuss the relative positive and negative aspects of each.

- **Need for a cooperative program to better assess the risks posed by mine wastes.**

  Several commenters (ASARCO Inc., Bureau of Mines, Unocal Corporation, NERCO Minerals Company) expressed a need for a more cooperative and comprehensive data gathering program involving identification and clarification of outstanding issues and data needs, and organization of industrial, state, and Federal data collection efforts. Some commenters supported more informal methods whereas others favored strict reporting schedules and the formation of special task forces specifically for this purpose. One responding organization (The Fertilizer Institute) expressed interest in assisting EPA, in reasonable capacities, to develop more thorough information.

- **Determination of the Agency's flexibility to impose additional regulatory requirements.**

  The regulated community was concerned with the extent of EPA's flexibility to impose different requirements on the mining industry. One respondent (ASARCO Inc.) recommended the formation of a special council to study the issue.

- **Preparation of a "significant risk matrix".**

  One company (ASARCO Inc.) suggested that the Agency prepare a special matrix which could be used to identify where and when further regulation may be needed.

- **Review of economic impact data.**

  One company (Newmont Services Ltd.) felt that further analysis of the economic impacts of the proposed regulations should be undertaken.

- **Recommendations for futher study within specific states.**

  Two respondents pointed out data insufficiencies within the states in which they operated. One of the commenters (Idaho Mining Association) noted that the EPA had not comprehensively reviewed mining and mineral processing techniques, and waste management practices utilized by the Idaho mining industry.

During their testimony in Tucson, the Pima Association of Governments made several recommendations regarding further studies they would like to see the EPA carry out. Specifically they recommended that:

- Further testing be conducted on dump leaching wastes around the mines in the Tucson area. They emphasized that this testing should not just be limited to sulfide leachates, but focus on oxide leaching activities as well.

- Radioactive waste disposal efforts be monitored at the Anamax mine where they said uranium is recovered from copper leach solutions.

- Inorganic and organic by-products from copper milling and flotation processes be investigated. Toxicity, fate, and transport, they stated, is unknown for chemicals such as xanthates, carbon disulfide, thionocarbamates, dithiophosphates, thiocarbanilide, xanthogen formates, pine oil, cresylic acid, and polyglycol esters.

References Summarized

Idaho Mining Association (004); pp. 2-3.

Newmont Services Ltd. (006); pp. 14-15.

FMC Corporation (Hollard & Hart) (008); pp. 2-3, 10, 17-18.

Kaiser Aluminum & Chemical Corp., Aluminum Division (009); pp. 14-16, (Robinson & McElwee, pp. 2).

Phelps Dodge Corporation (010); pp. 7-8.

James M. Montgomery, Consulting Engineers Inc. (011); pp. 4-10.

Battle Mountain Gold Co. (013).

St. Joe Minerals Corporation (014); pp. 2.7, 5.3.

AMAX Incoporated (016); pp. 4-5.

U.S. Department of Interior, Bureau of Indian Affairs (018); pp. 1.

ASARCO Inc. (019); pp. 12-13, 17-21.

The Fertilizer Institute (023); pp. 2,26,31.

Minerals Exploration Coalition (024); pp. 3.

FRM Minerals, Inc. (025); pp. 2.

David Paul Parker (026); pp. 2.

U.S. Department of the Interior, Bureau of Mines (030); pp. 1-3.

Kaiser Aluminum & Chemical Corporation , Aluminum Division (031); pp. 2-3, 7-8.

NERCO Minerals Company (033); pp. 4, 33.

Craig Simon (034); pp. 2.

Victor Kollock (035); pp. 2

Wyoming Mining Association (043); pp. 1.

American Mining Congress (046); pp. 4, 88-89.

State of Montana, Department of State Lands (051); pp. 1.

Duval Corporation (055); pp. 6.

Rocky Mountain Oil & Gas Association, Committee on Oil Shale (057); pp. 2.

Unocal Corporation (058); pp. 2.

NERCO Minerals Company Public Testimony - Denver (D2)); pp. 19-20.

ASARCO, Incorporated (Pubic Testimony - Tuscon (T2)); pp. 22.

Mike Wood (Public Testimony - Tuscon (T3)); pp. 32.

Southwest Environmenal Service (Public Testimony - Tuscon (T7)); pp. 46.

Pima Association of Governments (Public Testimony - Tuscon (T10)); p. 2.

4. REGULATORY

4.0 OVERVIEW

There were a substantial number of comments relating to the need for RCRA regulation of mine waste. The general tenor of the comments was that, based on the evidence available to date, RCRA regulation of mine waste is unwarranted and inappropriate, particularly in light of the existing Federal and state controls of many aspects of mine waste management. There were a few opposing viewpoints, particularly relating to the need to regulate copper mill tailings.

Some commenters argued that there is not yet a sufficient basis to determine whether regulation of mine waste under RCRA Subtitle C is warranted. Others argued that there is a sufficient basis to determine that RCRA Subtitle C regulation is definitely not warranted for certain wastes. Many commented that mine waste management is already regulated under a wide variety of Federal and state laws, notably the Clean Water Act and the Clean Air Act. Some commenters, however, noted deficiencies in existing regulations for protection of human health and the environment, particularly relating to control of mining on Indian lands, assurance of consistency among state regulations, and the regulation of heap leach operations.

The technical feasibility of RCRA Subtitle C regulation of mine waste was questioned by certain commenters, who listed various RCRA waste management requirements that are infeasible or inappropriate for some mine wastes (including synthetic liners, and caps for tailings ponds). Also, commenters recommended that regulatory requirements should be responsive to site-specific conditions. Some suggested that this could best be achieved by state-level regulation of mine waste management.

4.1 RCRA REGULATION OF MINE WASTE IS UNWARRANTED

Summary of Comments

Many commenters argued that the Report and the record to date were not a sufficient basis for determining whether RCRA Subtitle C regulation of mine waste is warranted.

They stressed that full Subtitle C regulation is not appropriate for mining and mineral processing wastes. Many concurred with the EPA where they suggested in the Report that a generic listing of mining wastes was not supported by the findings.

Other commenters made stronger statements regarding the need for regulation of specific mining wastes. The Fertilizer Institute argued that the Report and the results of studies to date "can, and should, form the basis of a determination, under §3001(b)(3)(c) of RCRA, that regulation for

phosphate mining and beneficiation wastes under Subtitle C is 'unwarranted'." (p. 14) They urged EPA to clarify its position to this effect. The Wyoming Mining Association, Gulf and Western Industries, Inc., and the American Mining Congress took similar positions with regard to overburden associated with uranium mines, and zinc tailings and wastes from iron ore and molybdenum, respectively.

Opposing Viewpoints

The State of Colorado, Department of Health concluded that certain mine waste should be regulated, stating:

> "Mining waste streams that are relatively uniform in charateristics and meet other requirements for listing as hazardous waste should be subject to full regulation under RCRA Subtitle C." (Public Testimony - Denver; p. 143)

The League of Women Voters of the State of Arizona believed that the Report demonstrated a need for regulation of the copper industry. They were particularly concerned with the presently unregulated copper mine tailings. The Arizona Department of Health Services added that the time for more studies is over and that it is now time to consider realistic proposals to regulate mining wastes.

The American Association of Retired Persons, State of Arizona was also concerned with potential contamination of drinking water and aquifers and urged "immediate positive actions" before "a catastrophic crisis develops." (Public Testimony - Tucson; p. 51)

Manasota - 88 testified that the adoption of regulations for the phosphate mining industry is "warranted and most necessary." (p. 16).

References Summarized

FMC Corporation (Holland & Hart) (008); p. 14.

ASARCO Incorporated (019); pp. 10, 12, 17.

Nevada Mining Association (022); p. 2.

The Fertilizer Institute (023); pp. 2, 3, 14, 19, 21.

Gulf & Western Industries, Inc. (Prather, Seeger, Doolittle & Farmer) (028); p. 3.

NERCO Minerals Company (033); p. 17.

Wyoming Mining Association (043); p. 1.

American Mining Congress (046); pp. 4, 199.

Duval Corporation (055); p. 5.

Rocky Mountain Oil & Gas Association, Inc., Committee on Oil Shale (057); p. 1.

Unocal Corporation (058); p. 5.

League of Women Voters of Arizona (Public Testimony - Tuscon (T6)); pp. 43-44.

American Association of Retired Persons, State of Arizona (Public Testimony - Tuscon (T8)); pp. 50-51.

Arizona Department of Health Services, Office of Waste and Water Quality Management (Public Testimony - Tuscon (T12)); p. 1.

State of Colorado, Department of Health (Public Testimony - Denver (D14)); p. 143.

Manasota -88 (Public Testimony - Washington, D.C. (W1)); p. 16.

4.2 APPLICABILITY OF RCRA REGULATION TO MINE WASTE MANAGEMENT

Summary of Comments

Many commenters argued that current hazardous waste regulations are not technically appropriate for addressing many of the problems related to mining waste. The Nevada Mining Association stated that:

> "It is inappropriate to apply hazardous waste management regulations and protocols that are designed for dealing with public and industrial disposal facilities that handle a multitude of concentrated wastes from diverse parties to operations that extract, beneficiate and process ores and minerals." (Nevada Mining Association, p. 4)

ASARCO Incorporated was concerned with the technical feasibility of applying RCRA practices used for small quantity wastes to large volume mining and mineral processing wastes. The commenter added illustrations of technical and other problems associated with RCRA application to mine waste.

Kennecott Copper Corporation and others highlighted certain Subtitle C requirements that commenters believed would be infeasible or unnecessary at active copper waste facilities, such as:

- Lining and capping. Commenters noted that the Report acknowledged the technical difficulties in using liners and caps at large-volume and large-area sites. In addition, they believed slope and dam structure stability problems would be caused by synthetic liners and would be unsafe.

- Ground-water monitoring. Commenters believed that compliance monitoring for most RCRA Appendix VIII constituents would be unnecessary at mine disposal sites.

In addition the Hecla Mining Company questioned the potential impact of these rules on using tailings to form a structural support in an underground mine. If mine tailings were to be classified as hazardous, they observed, backfilling would have the effect of classifying the whole mine as a hazardous waste disposal facility as a result of the RCRA rules.

Kennecott expressed their concern that Subtitle C regulations to mining waste would adversely affect integrated mining operations. They argued that if, as they asserted the Report suggested, copper dump leach liquor were listed as a hazardous waste, then all of the integrated (copper) facilities would become hazardous waste treatment facilities. They said that if the "derived from" and "mixture" rules of RCRA were to apply, the precipitation plant, smelter, acid plant, concentrator, and refinery could be classified as hazardous waste facilities and the product itself (copper, gold, and silver) could become a hazardous waste.

The Asbestos Information Association presented an argument stating why RCRA Subtitle C regulation of asbestos mine waste is inappropriate, indicating that the major potential hazard at asbestos mine waste sites is via airborne exposure only. It argued that asbestos fibers do not leach through soil and that airborne exposure risks are adequately controlled by NESHAP standards. In addition, it argued that certain RCRA manifest requirements are unnecessary because most generators dispose of wastes on site.

Recommendations

ASARCO Incorporated suggested that the Agency, if it finds that additional regulation of mining and mineral processing wastes is necessary, examine whether alternatives to RCRA (e.g., Water Pollution Control Act, Clean Air Act, Toxic Substances Control Act, Federal land management permitting authorities, state ground-water protection or mine waste programs) would be more efficient and adequately protective.

The State of Colorado, Department of Health suggested that "mining wastes that do not fall within the expanded scope of the definition of hazardous should be subject to regulation under RCRA Subtitle D" (Public Testimony - Denver) p. 143.)

AMAX Inc. proposed that EPA should exercise its authority under §3004(a) to create special rules for mining waste, with completely different standards and including a different classification scheme for mining wastes.

References Summarized

Placer, U.S. Inc. (003); p. 1.

FMC Corporation (Holland & Hart) (008); pp. 14, 16.

ASARCO Incorporated (019); p. 16.

Nevada Mining Association, Inc. (022); p. 4.

The Fertilizer Institute (023); pp. 8, 17-18, 27.

Gulf & Western Industries, Inc. (Prather, Seeger, Doolittle & Farmer) (028); p. 5.

Kennecott Copper Corporation (028A); p. 13.

U.S. Department of the Interior, Bureau of Mines (030); p. 2.

Kaiser Aluminum & Chemical Corporation, Industrial Chemicals Division and Harshaw/Filtrol Partnership (Vorys, Sater, Seymore and Pease) (031); pp. 8-9.

Helca Mining Company (036); pp. 2, 3.

Asbestos Information Association (054); pp. 2-7.

AMAX Incorporated (Public Testimony - Denver (D10)); p. 116.

State of Colorado, Department of Health (Public Testimony - Denver (D14)); p. 140.

4.3 EXISTENCE OF OVERLAPPING FEDERAL AND STATE REGULATIONS

Summary of Comments

Commenters universally criticized the EPA for failing to include in the Report an assessment of current regulation of mining waste. Even though Section 8002(p) of RCRA directs the Administrator to review studies and actions of other Federal and state agencies concerning mining waste, most commenters felt that the Report was inadequate. Thus, one commenter stated, the Report does not establish a need for additional regulation (Monsanto Chemical Company).

Commenters generally cited existing Federal, state, and local regulatory programs to support their contention that there are sufficient controls of the mining industry currently in place. One commenter stated that state and local regulations are particularly adapted to consider the site-specific factors essential to the proper regulation of any specific mining waste (AMAX Inc.).

Many respondents provided examples of Federal regulations applicable to mining waste that were not mentioned in the Report. Commenters noted that mining wastes are regulated under the following Federal authority:

- The Clean Water Act (CWA);
- The CWA Amendments of 1970 and 1977;
- The National Pollutant Discharge Elimination System (NPDES) under the CWA;
- The Clean Air Act (CAA);
- PSD and the National Emission Standards for Hazardous Air Pollutants (NESHAP) under the CAA (provides for regulation of asbestos mine waste among other pollutants);
- Federal Land Management and Policy Act of 1976 (FLMPA);
- The National Environmental Policy Act (NEPA);
- Surface Mining Control and Reclamation Act;
- Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA);
- The PCB Provisions of the Toxic Substances Control Act (TSCA);
- The UIC program under the Safe Drinking Water Act;
- Uranium Mill Tailings Radiation Control Act; and
- Standards designed to minimize levels of worker exposure to asbestos issued by the Occupational Safety and Health Administration, under the U.S. Department of Labor.

Several commenters also noted that the U.S. Forest Service regulates all aspects of surface disturbances, waste generation, and reclamation on National Forest lands as the Bureau of Land Management does on other Federal lands under FLMPA (Steven R. Murray, FMC Corporation, Nevada Mining Association).

In addition to mentioning these Federal regulatory programs, most respondents said that existing state programs regulating mining wastes are sufficient to protect human health and the environment. One commenter cited a 1984 report to the EPA by Charles Rivers Associates which stated:

> "Many states have permitting requirements that mandate state approval of all aspects of mining and milling operations, waste water treatment and reclamation. State approval is not given unless operations meet state pollution and resource conservation objectives which are often more stringent than federal standards "(ASARCO, Inc.,p. 14).

Respondents provided the following examples of state regulation of mining wastes:

- **The State of California** regulates the discharge of waste water and can require hydrogeologic assessments. (Unocal Corporation);
- **The State of Wyoming** land reclamation regulations require reclamation of all mining disturbances (Wyoming Department of Environmental Quality, Wyoming Mining Association, Tennessee Valley Authority);
- **The State of Colorado** comprehensively regulates mining wastes pursuant to the Colorado Mined Land Reclamation Act and has adopted systems to classify and regulate both surface water and ground water quality (Colorado Mining Association);
- **The States of Montana, Colorado, California, Utah, and South Dakota** require extensive mining and reclamation plans to be filed before a mining project may be initiated. They also have comprehensive permitting requirements for both surface and underground mines. In these states and others, most new mining projects must have prepared an environmental impact statement which is subject to review and approval by state and Federal agencies prior to receiving permission to operate. (American Mining Congress, Northwest Mining Association, Texasgulf Mining and Metals);
- **The State of Florida** has developed groundwater permitting and monitoring requirements which are currently in place at phosphate operations in the State. (The Fertilizer Institute);

- **The State of Washington** has a regulatory program to address discharges to the groundwater system, under the Washington Water Pollution Control Act as administered by the Washington Department of Ecology. These regulations require a waste discharge permit for any commercial or industrial operation discharging solid or liquid waste into groundwater. Washington also has surface mining reclamation standards used in conjunction with State environmental policy acts. (Hecla Mining Company, American Mining Congress);

- **The State of Montana**, since the adoption of the Montana Ground-Water Pollution Control system regulations in 1983, requires all mining ventures (where ground-water monitoring is necessary) to have monitoring programs. In addition, proposed mining projects are required to control process waters and other waters in the mine area during and after mining to comply with existing water quality regulations. (State of Montana, Department of State Lands);

- In **the State of Nevada**, 87 percent of the land surface is owned by the Federal government, so few mining operations can take place on land that is exempt from the requirements of NEPA. In addition, the NPDES regulatory program as applied to mining is administered by the State of Nevada, Department of Conservation and Natural Resources. Finally, Nevada miners cannot mine without evaluating and mitigating adverse long-term and short-term environmental effects on a case-by-case basis. (Nevada Mining Association);

- **The State of Idaho** has surface mining reclamation standards which are enforced in conjunction with State environmental policy acts. The State regulates mining through the State Bureau of Water Quality, the State Department of Water Resources and State Land Department, among others. (Idaho Mining Association, American Mining Congress);

- **The State of Missouri** regulates surface water pollution, subsurface water pollution and air pollution associated with the generation of mine wate through the Missouri Clean Water Law, the Missouri Air Pollution Law, the Missouri Dam Safety Law and the Missouri Waste Management Law (Missouri Department of Natural Resources, St. Joe Minerals Corporation);

- **The State of New York**, under the New York Environmental Conservation Law, requires permits for the discharge of wastewaters into navigable waters and has established water quality standards for surface

waters which are protective of both human health and aquatic life. The New York Solid Waste Management laws provide for promulgation of regulations to manage the generation, treatment, storage and disposal of solid waste in the State (St. Joe Mineral Corporation);

- As of July 1985, **the State of Arizona** has enforced a ground water quality permit program which requires any facility with the potential to adversely impact groundwater to apply for a permit. Arizona is also currently amending its groundwater legislation to tighten its control over this resource. The State's air quality program also regulates mining (Newmont Services Ltd., Pima Association of Governments);

- **New Mexico, Utah, Nevada, and Arizona** have all adopted groundwater protection requirements (Kennecott Copper Corporation).

Recommendations

Many commenters specifically recommended that the EPA review existing Federal, state and other regulatory programs prior to deciding whether or not it is necessary to initiate further rulemaking efforts to control mining wastes. The following statement by the American Mining Congress reflects the sentiments of the majority of commenters on this issue:

> "A thorough review of existing federal and state regulations not only is essential to any rational determination under Section 3001(b)(3)(c), but is also mandated pursuant to Section 8002(f) and (p)." (American Mining Congress, p. 46)

In determining the need for additional regulation, one commenter noted that the focus should be on current practices and not on isolated past incidents (Colorado Mining Association). To this end, one commenter recommended that each state be contacted for input before any new laws are promulgated (Battle Mountain Gold Company). Similarly, another commenter stated that future regulations should augment current regulations, not just create a new bureaucracy with which the mining industry must contend (Foth & Van Dyke).

On specific issues:

- Two commenters recommended that oil shale be deleted from consideration for further regulation on the grounds that sufficient Federal and state controls are already in place (Rocky Mountain Oil & Gas Association, Inc., Unocal Corporation);

- One Federal agency suggested that leaching operations remain under the control of state regulatory agencies, with the Federal government providing guidelines and support (U.S. Department of the Interior, Bureau of Mines).

Opposing Viewpoint

One commenter opposed the idea that existing Federal and state regulation of mining waste is sufficient (U.S. Department of the Interior, Bureau of Indian Affairs). In particular, this commenter noted that there is no consistency in how industries are regulated and that industries need only report to the state in which their operations are located. It was believed that this manner of regulation does not allow for adjacent states or Indian tribes to be assured even minimal requirements and that states do not have jurisdiction for management and enforcement of state regulations on Indian lands. This commenter stated that, because most Indian tribes have not developed mine waste regulations, they depend on Federal regulations and enforcement for mining operations on Indian lands. It was recommended that the EPA promulgate minimal regulations for the protection of the environment, drafted to conform with environmentally-acceptable existing state regulations and industry practices. It was suggested that states may then adopt such regulations or develop more stringent ones. Further, the commenter stated that the need to develop Federal regulation is more critical in view of New Mexico's recent decision to turn back to the EPA the responsibilities for licensing and regulating uranium mining and milling operations. (U.S. Department of Interior, Bureau of Indian Affairs).

Another commenter implied that additional Federal regulations are necessary by stating that current hazardous waste regulations are not technically appropriate for addressing many of the problems related to mining wastes (State of Colorado, Department of Health).

Finally, the State of South Dakota supported the regulation of heap leach operations by RCRA. It noted that states have widely varying requirements and often lack the regulations to require adequate environmental controls. (South Dakota Department of Water and Natural Resources).

References Summarized

The State of Wyoming, Department of Environmental Quality (001); p. 2.

Idaho Mining Association (004); pp. 3-8.

Newmont Services Ltd. (006); p. 2.

Lacana Mining Inc. (007); p. 1.

FMC Corporation (Holland & Hart) (008); p. 5.

Battle Mountain Gold Company (013); p. 2.

St. Joe Minerals Corporation (014); pp. 3.31-3.33.

Northwest Mining Association (015); p. 5.

Unocal Corporation (058); pp. 3-4.

AMAX Inc. (016); p. 16.

Homestake Mining Company (017); p. 2.

United States Department of the Interior, Bureau of Indian Affairs (018); pp. 3-4.

ASARCO Incorporated (019); pp. 14-15.

Nevada Mining Association (022); pp. 2-4.

The Fertilizer Institute (023); p. 12.

Minerals Exploration Coalition (MEC) (024); p. 1.

Foth & Van Dyke and Associates, Inc. (027); p. 2.

Kennecott Copper Corporation (28A); pp. 6-7.

Tennessee Valley Authority (029); p. 2.

United States Department of the Interior, Bureau of Mines (030); p. 2.

Minatome Corporation (032); pp. 1-2.

NERCO Minerals Company (033); pp. 3, 12.

Hecla Mining Company (036); p. 2.

Monsanto Chemical Company (037); p. 31.

Steven R. Murray (041); p. 2.

Wyoming Mining Association (043); p. 2.

Gold Fields Mining Corporation (045); p. 2.

American Mining Congress (046); pp. 8-9, 39-40.

University of Idaho, College of Mines and Earth Resources, Department of Metallurgical and Mining Engineering (047); p. 65.

Coeur Explorations, Inc. (049); p. 2.

State of Montana, Department of State Lands (051); pp. 1-2.

Asbestos Information Association (054); pp. 5-6; 10.

Duval Corporation (055); p. 4.

Texasgulf Minerals & Metals, Inc. (056); pp. 1-2.

Rocky Mountain Oil and Gas Association, Inc., Committee on Oil Shale (057); p. 3.

Missouri Department of Natural Resources (060), pp. 1, 4.

South Dakota Department of Water and Natural Resources (L002); p. 1.

Colorado Mining Association (Public Testimony - Denver (D1)); p. 6.

American Mining Congress (Public Testimony - Denver (D7)); pp. 4, 46, 67.

State of Colorado, Department of Health (Public Testimony - Denver) (D14)); p. 140.

Pima Association of Governments (Public Testimony - Tucson (T10)); p. 3.

4.4 NEED FOR SITE-SPECIFIC REGULATORY FLEXIBILITY

Summary of Comments and Recommendations

The major point made by many commenters, who addressed the need for regulatory flexibility, dealt with the Congress' long-standing recognition of the differences between mining waste and industrial waste. This, they emphasized, was reflected in the 1984 RCRA Amendment (Section 3004 (x)) which gave specific acknowledgement of EPA's flexibility in taking into account the practical difficulties associated with regulatory implementation.

The American Mining Congress, in supporting the regulatory flexibility mandate provided in §3004(x), quoted from Senator Simpson (author of the Section):

> "I think that it is important to point out that protection of public health and environment is a braod, over-arching goal, which is only given precise meaning within the context of a specific regulatory decision. Consequently, the Administrator would not be bound by a decision made in a different factual context in determining the appropriate manner in which to regulate mining wastes. 130 Congressional Record §9180 (July 25, 1984) (remarks of Senator Simpson)" (emphasis added by AMC).

Therefore commenters reported that this section (3004(x)) should be considered along with Congress' concern that any regulation of mining and mineral processing wastes be appropriate to their adverse effects.

Many commenters shared the view expressed by Kennecott Copper Corporation that:

> "[T]he potential variation among sites is so great that it is impossible to formulate reasonable generic mine waste regulations. Where regulation of mine waste appears necessary at a particular site, the only reasonable approach is to study each of these factors in detail and tailor required controls accordingly." (p. 11.)

Others suggested that individual states should be allowed to develop regulations suited to the conditions within the state. Steffen, Robertson & Kirsten and the California Mining Association testified that the EPA should:

> "Not go beyond setting up a general regulatory framework with general performance type regulations, and leave the site-specific, the mine-type-specific regulations to the states and the counties", (Public Testimony - Denver; p. 154)

The University of Missouri-Rolla, Battle Mountain Gold Company, Gulf and Western Industries and J.R. Simplot Company recommended site-specific regulations and controls for lead wastes in Missouri, cyanide-containing waste, zinc tailings, and phosphate overburden, respectively.

The State of Colorado, Department of Health recommended flexible determination of design features of waste piles, landfills, and surface impoundments at mine waste sites.

References Summarized

Placer, U.S. Inc. (003); p. 2.

FMC Corporation (Holland & Hart) (008); p. 15.

Battle Mountain Gold Company (013); p. 5.

Gulf & Western Industries, Inc. (028); pp. 8, 10.

Kennecott Copper Corporation (028A); p. 3.

NERCO Mineral Company (033); p. 5.

Hecla Mining Company (036); p. 3.

University of Missouri-Rolla (040); p. 2.

American Mining Congress (046); pp. 17-19.

Alaska Miners Association (050); p. 4.

J.R. Simplot Company (052); pp. 2, 4.

Unocal Corporation (058); p. 8.

State of Missouri, Department of Natural Resources (060); p. 11.

Steffen, Robertson & Kirsten and the California Mining Association (Public Testimony - Denver (D15)); p. 154.

Texasgulf Minerals and Metals, Inc. (056); p. 2.

State of Colorado, Department of Health (Public Testimony - Denver) (D14)); pp. 141, 142.

5. ECONOMIC

5.0 OVERVIEW

Commenters who responded in this area generally believed that the estimated costs of compliance used in the Report were too low. Many expressed dissatisfaction with what, they stated, were undocumented assumptions used in the calculation and estimation of the compliance costs. Almost all of the comments summarized made the observation that the economic impact of Subtitle C regulations on the minerals industry would be tremendous, and that these impacts had been inadequately addressed by the EPA.

One respondent, defending the need to regulate, commented that the costs to neighboring communities from a failure to regulate were not addressed. This commenter argued that these costs also should be taken into consideration before making a regulatory determination.

Some recommended that the EPA conduct an economic impact study before costly new regulations are added.

5.1 ASSESSMENT OF COMPLIANCE COSTS AND ESTIMATING METHODOLOGY

Several commenters stated that, in their opinion, the Report underestimated the cost of complying with the added standards imposed by Subtitle C regulation under RCRA. Kennecott Copper Corporation stated that it had reason to believe that the costs associated with certain scenarios presented in the Charles River Associates (CRA) report were understated, "... perhaps significantly." (p. 13, Appendix B, Kennecott Copper Corporation)

Kennecott commented on the difficulty it had in replicating the CRA cost estimates, because of what they believed were missing computational assumptions in the CRA report. These included: which mines were in the data base; what cost items were assumed necessary at each mine for each regulatory scenario; and what site-specific factors were used (such as size of tailings pond, estimated annual volume of waste etc.).

The Bureau of Mines and the American Mining Congress stated that they found the compliance cost estimation methodology to be inadequately documented in several areas. They emphasized that without these data a serious review of the Report was precluded. They stated the following areas lacked sufficient detail in which to proceed with compliance cost estimation and an economic impact analysis:

- Design criteria - tailings treatment plants, interceptor and monitoring wells, and leachate collection systems not provided;
- Capital cost - no supporting documentation exccpt for underliners and caps;

- Adjustment factors - costs for operational, climatic, and hydrological conditions not provided and therefore did not approximate real world conditions;
- Operation and maintenance costs - assumed to be a flat percentage without documentation or justification;
- Research and development costs - for process modifications not adequately considered or documented;
- Site-specific costs - not considered for variations in presence and number of aquifers, layout, seasonal precipitation, processing technology, reagents used, and ore/waste characteristics;
- Compliance costs - Only direct costs were estimated; costs for permit renewals, financial guarantees, potential hazardous waste disposal taxes, and analytical testing were not considered - all of which could lead to substantial increases in production costs.

Kennecott attempted to verify the CRA cost estimates by applying the cost estimates for Scenario 1B to their facility in Utah. In using these cost assumptions, Kennecott reported calculating a cost of $12 billion for this facility. They reported that this was approximately 41 percent of CRA's estimate for the entire (presumably copper) industry. For illustration, Kennecott showed that the CRA costs to purchase and install a monitoring well were underestimated. They reported that their cost was approximately $15,000 per well and that the CRA report estimated $5,000 per well. They said this one item would amount to a cost difference of nearly $1 million in capital costs for their operations alone.

St. Joe Minerals Corporation stated that they hired Engineering-Science (ES) to estimate the costs associated with implementing the RCRA standards for hazardous and nonhazardous material disposal at their Viburnum mine tailings facility in Missouri. In a comparison of the costs estimated by ES with those estimated by CRA, St. Joe commented that ES's incremental costs for future waste management under Subtitle C standards were 2.7 times greater than the costs estimated by CRA ($194 million vs. $72.3 million). The major difference, as reported by St. Joe, was because facility preparation costs were not included in the CRA study, including the costs for preparation and installation of a pond liner system.

St. Joe commented that the cost estimate prepared by ES was for their Virburnum mine tailings facility only. They estimated that the total cost for their lead/zinc operations would be close to $1 billion. They concluded by stating:

> "The ES cost study is based upon carefully developed and documented unit costs for the Viburnum, Missouri,

> area. The CRA study is, on the other hand, based upon poorly documented assumptions and unit costs; so much so that comparisons with the remaining CRA 'scenarios' became impossible since the CRA cost basis was so obscure." (St. Joe Minerals Corporation, p. 6.40)

One respondent (Phelps Dodge Corporation) felt that the Report underestimated costs because it overlooked what they believed was the potentially staggering cost of corrective actions pursuant to Section 3004(u) of RCRA. ASARCO Incorporated commented that the Report's cost estimates were too low because the cost estimates were based on the level of regulation that was in effect prior to the enactment of the 1984 amendments to RCRA and therefore prior to the imposition of more stringent regulatory and costly requirements.

One respondent criticized the Report for using, what they referred to as, "proprietary data [via the CRA report] that was not obtained directly from the mining industry." (St. Joe Minerals Corporation p. 7.4) They stated that since the plant information was not provided, there was not an opportunity to review the mine/mill cost data nor to provide a meaningful critique of the cost impacts. Economic Consulting Services Inc. (for the American Mining Congress), in this same vein, added that it was not possible to verify whether co-product credits were included and whether the CRA report considered other cost elements in addition to mine-level production costs.

Economic Consulting Services Inc. (ESC) identified what they believed to be an error in CRA's Net Present Value (NPV) computer algorithm. They stated that they were not able to replicate CRA's calculations for this reason and also because CRA was using site-specific data which was unavailable to ECS.

> "Upon notification by ECS concerning the apparent algorithm error, CRA indicated that it would recalculate its NPV estimates. At the time of the completion of this ECS report [March 25, 1986], ECS had not received CRA's recalculated NPV estimates. Therefore, ECS's assessment of the overall CRA analysis must necessarily remain conditional given the absence of what would be considered CRA's final figures." (Appendix G, American Mining Congress, p. 3)

The Bureau of Mines indicated that they have initiated an independent effort to estimate and analyze mining waste compliance costs and their resulting economic impacts. They stated this study is planned to be completed by June, 1986.

References Summarized

Phelps Dodge Corporation (010); p. 8.

St. Joe Minerals Corporation (014); p. 6.40.

ASARCO Incorporated (019); p. 11.

United States Department of the Interior; Bureau of Mines (030); p. 2.

American Mining Congress (046); pp. 54-55, 57.

J.R. Simplot Company (052); p. 3.

Kennecott Copper Corporation (Public Testimony - Washington (W2)); pp. 25-26.

5.2 ASSESSMENT OF ECONOMIC IMPACTS

Summary of Comments

A large number of those who responded in writing expressed concern over the economic impacts that would be caused by the increased costs of regulation to the mining industry. They commented that the Report had failed to adequately address the impacts to the industry and the economy. The mining industry is currently in a very depressed state, according to many respondents, and has been experiencing a marked decrease in profitability over the past several years. Increased costs due to the imposition of new regulations, it was believed by the commenters, would result in significantly adverse economic impacts. Several of these commenters questioned the continuing economic feasibility of the mining industry in the face of these potential new regulations.

A few commenters felt that the increased costs associated with the new regulations would cause the collapse of the domestic mining industry. Minerals Exploration Coalition stated that the mining community is in the worst condition it has been in for several generations due to competition from low-cost imports, stringent environmental regulations, and having to mine reserves that are often much lower in grade than the foreign competition. The Northwest Mining Association said that the mining industry is already regulated to the point of little or no profit and that these new regulations could spell the extinction of mining in the United States. NERCO Minerals Company explained that if they were faced with Subtitle C compliance requirements today, their capital costs for regulatory controls would nearly double, and as a result, their current operations would not be economically feasible.

The American Mining Congress predicted that these increased regulatory costs would increase the likelihood of mine closures and the economic and social costs associated with such mine closures. Exvenco Resources Inc. stated that the regulatory costs would affect the marginal grade producers disproportionately, and that in most cases the extra costs would exceed the net pre-tax profit of these facilities by a considerable margin.

Some expressed concern over the possibility that the higher costs due to increased regulation could cause the United States to become dependent upon foreign countries for basic materials and ores. FRM Minerals noted that the higher costs would inevitably lead to the closure of existing mines and further curtail exploration for new ore deposits. This situation, they postulated, would put the United States at the mercy of foreign countries for the supply of ores.

Several commenters felt that the Report did not take into account the full economic impact of the proposed regulations. The Nevada Mining Association stated that although the Report presented eight cost scenarios, none considered the ramifications of mine/mill closings, employment losses, price changes, and international trade effects. Monsanto Chemical Company noted that the failure of the Report to consider these broad economic impacts of the proposed regulations was disturbing because these are the economic effects of most concern in remote areas where the mines, mills, and processing plants are the backbones of the local economies. The Northwest Mining Association objected because the Report did not take into account the costs of promulgation, implementation, and enforcement of the new regulations in each state.

One commenter (Alaska Miners Association) maintained that the post-closure maintenance and monitoring plan contained in the Report is completely unreasonable. This commenter proposed that each operation should have site-specific plans at closure that will allow rapid closure of the waste facility without excessive burden on the operator. Also, this respondent felt that the financial assurance requirements on closure as set out in RCRA Subtitle C would prevent new mines from being permitted because of a lack of financial assurance for post-closure observation and maintenance.

Recommendations

Two commenters (Nevada Mining Association, Inc. and Sunshine Mining Company) recommended that before the EPA imposes costly regulations on an industry which is already in a depressed economic state, an economic impact study should be undertaken.

Opposing Viewpoint

The Green Valley Community Coordinating Council, Inc. agreed, in effect, with other commenters that the Report did not take into account all the costs associated with the proposed regulations. However, they observed that if the EPA is inclined not to regulate the mining industry, the Agency should first consider the large external economic impacts that would be borne by adjacent communities.

References Summarized

Superior Mining Company(002); p. 3.

Phil R. Fikkan (005); p. 1.

Lacana Mining Inc. (007); p. 1.

FMC Corporation (Holland & Hart) (008); pp. 15-16.

Coeur-Thunder Mountain, Inc. (012); p. 2.

Northwest Mining Association (015); p. 6.

ASARCO Incorporated (019); p. 7.

Sunshine Mining Company (021); p. 30.

Nevada Mining Association (022); pp. 8-9.

Minerals Exploration Coalition (MEC) (024); p. 1.

FRM Minerals, Inc. (025); p. 3.

Foth & Van Dyke and Associates, Inc., Waste/Energy Division (027); p. 2.

Gulf and Western Industries, Inc. (Prather, Seeger, Doolittle and Farmer) (028); p. 7.

Kennecott Copper Corporation (028A); p. 16.

Minatome Corporation (032); p. 1.

NERCO Minerals Company (033); pp. 2-3.

Monsanto Chemical Company (037); p. 3.

Ventures Trident (042); p. 2.

Exvenco Resources, Inc. (044); p. 1.

American Mining Congress (046); pp. 52-53.

University of Idaho College of Mines and Earth Resources, Department of Metallurgical and Mining Engineering (047); pp. 1-2.

Alaska Miners Association (050); pp. 1-2.

J.R. Simplot Company (052); p. 4.

Unocal Corporation (058); p. 3.

Green Valley Community Coordinating Council, Inc. (Public Testimony - Tuscon (T1)); p. 15.

NERCO Minerals Company (Public Testimony - Denver (D2)); p. 10.

6. RECOMMENDATIONS

6.0 OVERVIEW

The major theme of recommendations was that further data collection and interpretation along with detailed health risk and economic analyses are necessary before regulations are promulgated. Other recommendations called for development of better methods of sampling and testing and establishment of more appropriate criteria for judging whether a hazard exists. Many recommendations dealt with the intentional or inadvertent sampling of process streams and interpretation of these data as though they were waste streams.

6.1 SUMMARY OF RECOMMENDATIONS MADE EARLIER

The recommendations compiled in this section have been presented earlier in Chapters 2 through 5 entitled "Legal/Procedural," "Technical," "Regulatory," and "Economic." They are presented below under these subheadings.

The Legal/Procedural recommendation most often made was for the EPA not to consider making a regulatory determination regarding the mining industry until the Congressional requirement for a "detailed and comprehensive study" was completely satisfied. Most commenters suggested that additional studies, analyses, and risk assessments were necessary on the part of the EPA. Many respondents believed that all processing wastes subject to the Bevill mining waste exclusion should be given proper consideration under Section 3004(x). Others commented that a complete Report to Congress should include a study of ore processing wastes and that new regulations should not be undertaken until the EPA has fully examined the adequacy of the existing state regulatory programs. The EPA was urged to re-examine the data generated by its contractors and to reconsider the direction in which the Report's recommendations point.

Technical recommendations focused on avoiding the use of inadequate data and methods or making inappropriate interpretations. Recommendations were made in the areas of the E.P. toxicity test, corrosivity, acid forming potential, cyanide, and radioactivity as follows:

- There is a need to develop a more accurate waste classification system that is based on an acid/base determination of the waste's potential for mobilizing metals;
- A suitable test for determining the acid forming potential corrosivity of solids needs to be developed;
- More study is needed on the use and fate of cyanide species and complexes at typical mining and beneficiation operations;

- A distinction between the potential for harm from total cyanide and from free cyanide must be made;
- Site-specific risk assessments of radiation emissions should be used in developing regulations; and
- Additional data concerning uranium overburden are available and should be considered from the States of Wyoming and New Mexico.

Many commenters recommended that process streams not be considered as, or confused with, waste streams.

A large portion of the respondents offered suggestions regarding (1) where existing data are deficient, (2) where further study is most needed, and (3) alternative methods for assimilating and interpreting data. In general, these recommendatiions focused on:

- Additional sampling and analysis of waste types and streams to assess the risks posed by mining wastes;
- Additional monitoring and analysis of ground- and surface-waters;
- More thorough assessment of the efficacy and costs of alternative pollution control options;
- Determination of modified controls which might be appropriate for different categories of waste, site, and management practices; and
- More thorough investigation of the body of federal and non-federal regulations affecting the mining industry.

The specific waste types and management practices which were suggested for further study included: clays and non-metallic wastes, disposal of organics in tailings, cyanide leaching, bauxite refining and primary aluminum reduction, radiation emissions from uranium mine materials, heap and dump leaching, and evaluation of natural attenuation effects around ore bodies. Other recommendations for further study included: better analyses, determination of the Agency's flexibility to impose additional regulatory requirements, review of economic impact, and recommendations for further study in specific states. (See recommendations in Section 3.9 for further detail.)

The Regulatory aspects of the recommendations stressed, in general, further study prior to application of RCRA. Many of the commenters who argued that RCRA Subtitle C regulation of mine waste was unwarranted and urged the EPA to make a regulatory determination to this effect. In particular, various

commenters encouraged the EPA to determine that regulation of uranium mine overburden, zinc tailings, iron ore and molybdenum wastes, and phosphate mining wastes was unwarranted. One commenter, in favor of regulation, urged the EPA to subject all mining waste streams, that are relatively uniform in characteristics and meet other requirements for listing as hazardous waste, to full regulation under RCRA Subtitle C. Other commenters urged the EPA (in non-specific terms) to take action to address copper wastes (in Arizona).

Certain commenters, who were concerned that many of the provisions of RCRA regulation are not applicable and appropriate for mine waste management, recommended that the EPA examine alternatives to RCRA regulation, such as the Water Pollution Control Act, the Clean Air Act, the Toxic Substances Control Act, and other federal and state programs, to determine whether these would provide more efficient means of protecting human health and the environment. Commenters also urged the EPA to examine existing Federal and state regulations applied to mine waste management to ascertain whether these agencies are already protective of human health and the environment, and to avoid unnecessary overlap and conflict between various regulatory agencies. Two commenters recommended that oil shale be deleted from consideration for further regulations on the grounds that sufficient controls are already in place.

Many commenters recommended that the EPA make mine waste regulations flexible, so that site-specific factors can be taken into account when determining the controls that are required at a particular site. Some commenters suggested that the EPA set up a general regulatory framework with performance-type regulations, but leave site-specific and mine-specific regulations to states and counties.

Commenters also suggested that, in determining the need for regulation, EPA should focus on current practices, not on past incidents.

Concerning Economics, commenters recommended that before the EPA imposed costly regulations on an industry which is already economically depressed an economic impact study should be undertaken.

INDEX

COMMENTS RECEIVED

Written Comments:

Docket No.	Respondent	Category
MWRC 001	The State of Wyoming, Department of Environmental Quality	State Agency
MWRC 002	Superior Mining Company	Mining Company
MWRC 003	Placer U.S. Inc.	Mining Company
MWRC 004	Idaho Mining Association	Mining Association
MWRC 005	Phil R. Fikkan	Private Citizen
MWRC 006	Newmont Services Ltd., A Subsidiary of Newmont Mining Corporation Attachments [5]	Mining Company
MWRC 007	Lacana Mining Inc.	Mining Company
MWRC 008	FMC Corporation (Holland & Hart)	Mining Company
MWRC 009	Kaiser Aluminum & Chemical Corporation, Aluminum Division (Robinson & McElwee)	Mining Company
MWRC 010	Phelps Dodge Corporation (Evans, Kitchel & Jenckes)	Mining Company
MWRC 011	James M. Montgomery, Consulting Engineers, Inc.	Consultant
MWRC 012	Coeur - Thunder Mountain, Inc.	Mining Company
MWRC 013	Battle Mountain Gold Company Attachments [3]	Mining Company
MWRC 014	St. Joe Minerals Corporation Attachments [5]	Mining Company
MWRC 015	Northwest Mining Association (See also #L001)	Mining Association

Docket No.	Respondent	Category
MWRC 016	AMAX Inc., Western Area Law Department, AMAX Minerals and Energy Attachments [4]	Mining Company
MWRC 017	Homestake Mining Company Attachments [7]	Mining Company
MWRC 018	United States Department of the Interior, Bureau of Indian Affairs, Navaho Area Office Attachment [1]	Federal Agency
MWRC 019	ASARCO Incorporated Appendix [1]	Mining Company
MWRC 020	Unocal Corporation (see also #58) Attachment [1]	Mining Company
MWRC 021	Sunshine Mining Company Attachments [3]	Mining Company
MWRC 022	Nevada Mining Association, Inc.	Mining Association
MWRC 023	The Fertilizer Institute	Trade Association
MWRC 024	Minerals Exploration Coalition (MEC)	Mining Association
MWRC 025	FRM Minerals, Inc.	Mining Company
MWRC 026	David Paul Parker	Private Citizen
MWRC 027	Foth & Van Dyke and Associates, Inc., Waste/Energy Division	Consultant
MWRC 028	Gulf & Western Industries, Inc (Prather, Seeger, Doolittle & Farmer)	Mining Company
MWRC 028A	Kennecott Copper Corporation Attachments [3]	Mining Company
MWRC 029	Tennessee Valley Authority	Federal Agency
MWRC 030	United States Department of the Interior, Bureau of Mines Attachments [6]	Federal Agency

Docket No.	Respondent	Category
MWRC 031	Kaiser Aluminum & Chemical Corporation, Industrial Chemicals Division and Harshaw/Filtrol Partnership (Vorys, Sater, Seymore and Pease) Attachments [1]	Mining Company
MWRC 032	Minatome Corporation	Mining Company
MWRC 033	NERCO Minerals Company	Mining Company
MWRC 034	Craig Simon	Private Citizen
MWRC 035	Victor Kollock	Private Citizen
MWRC 036	Hecla Mining Company Attachments [3]	Mining Company
MWRC 037	Monsanto Chemical Company Attachment [1]	Mining Company
MWRC 038	Rocky Mountain Energy, A Subsidiary of Union Pacific Corporation	Mining Company
MWRC 039	Reynolds Aluminum, Reynolds Metals	Mining Company
MWRC 040	University of Missouri - Rolla, Environmental Research Center	University
MWRC 041	Steven R. Murray	Private Citizen
MWRC 042	Ventures Trident	Consultant
MWRC 043	Wyoming Mining Association	Mining Association
MWRC 044	Exvenco Resources Inc.	Mining Company
MWRC 045	Gold Fields Mining Corporation Attachments [2]	Mining Company
MWRC 046	American Mining Congress Attachments [16]	Trade Association
MWRC 047	University of Idaho, College of Mines and Earth Resources, Department of Metallurgical and Mining Engineering	University
MWRC 048	Brush Wellman, Inc.	Mining Company

Docket No.	Respondent	Category
MWRC 049	Coeur Explorations, Inc.	Mining Company
MWRC 050	Alaska Miners Association	Mining Association
MWRC 051	State of Montana, Department of State Lands	State Agency
MWRC 052	J.R. Simplot Company	Mining Company
MWRC 053	H.F. Magnuson Company	Consultant
MWRC 054	Asbestos Information Association Attachment [1]	Trade Association
MWRC 055	Duval Corporation	Mining Company
MWRC 056	Texasgulf Minerals and Metals, Inc.	Mining Company
MWRC 057	Rocky Mountain Oil & Gas Association, Inc., Committee on Oil Shale	Trade Association
MWRC 058	Unocal Corporation (resubmission - see #20) Attachment [1]	Mining Company
MWRC 059	Samuel Dunaway, Jr.	Private Citizen
MWRC 060	State of Missouri, Department of Natural Resources	State Agency
MWRC L001	Northwest Mining Association (resubmission - see #15)	Mining Association
MWRC L002	South Dakota Department of Water and Natural Resources	State Agency

Public Hearing Proceedings:

Speaker No.	Respondent	Category
	Tuscon, AZ -- 6 March 1986 [T]	
T1	Green Valley Community Coordinating Council, Inc.	Citizens Group
T2	ASARCO, Inc.	Mining Company

Speaker No.	Respondent	Category
T3	Mike Wood	Private Citizen
T4	Alvin W. Gerhardt	Private Citizen
T5	D.W. Jaquays	Private Citizen
T6	League of Women Voters, State of Arizona	Citizens Group
T7	Southwest Environmental Service	Consultant
T8	American Association of Retired Persons, State of Arizona	Citizens Group
T9	Newmont Mining Corporation	Mining Company
T10	Pima Association of Governments	State and Local Agency
T11	Pima County Health Department	State and Local Agency
T12	Arizona Department of Health Services, Office of Waste and Water Quality Management	State and Local Agency
T13	Santo Tomas Awareness Group	Environmental Group
T14	Roy Goodman	Private Citizen
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W1	Manasota - 88	Environmental Group
W2	Kennecott Copper Corporation	Mining Company
W3	Kaiser Aluminum and Chemical Corporation	Mining Company
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W5	The Gradient Corporation	Consultant

Speaker No.	Respondent	Category
W6	TRC Environmental Consultants Company	Consultant
W7	Homestake Mining Company and Nevada Mining Association	Mining Company and Mining Association
	Denver, CO -- 13 March 1986 [D]	
D1	Colorado Mining Association	Mining Association
D2	NERCO Minerals Company	Mining Company
D3	St. Joe Minerals Corporation	Mining Company
D4	Hydro - Search, Inc.	Consultant
D5	American Mining Congress	Trade Association
D6	Dames & Moore	Consultant
D7	American Mining Congress	Trade Association
D8	FMC Corporation	Mining Company
D9	Idaho Mining Association	Mining Association
D10	AMAX Inc.	Mining Company
D11	Sunshine Mining Company	Mining Company
D12	Monsanto Chemical Company, St. Louis	Mining Company
D13	Jim Rouse	Private Citizen
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	[b] Comments of Newmont Mining Corporation on EPA's Proposal to Reinterpret Coverage of the Bevill Amendment
	[c] Statement of the Honorable Tom Bevill on RCRA Mine Waste Exclusion Before the EPA, Washington, D.C., November 14, 1984
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	[e] Comments of Newmont Mining Corporation and Subsidiaries on the Mining Waste Exclusion in the Solid Waste Disposal Act Amendments of 1980
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	[a] "Cyanide and the Environment", Proceedings of a Conference, Tucson, Arizona, December 11-14, 1984, Volume 2
	[b] "Cyanide and the Environment", Proceedings of a Conference, Tucson, Arizona, December 11-14, 1984, Volume 1
	[c] "Cyanide from Mineral Processing", Proceedings of a Workshop, Salt Lake City, Utah, February 2-3, 1982
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	[b] A Compilation of Pertinent Information Regarding Complexed Cyanides in Mineral Flotation Tailings Prepared for AMAX Environmental Services, Inc. by Environmental Science, Inc.
	[c] "Cyanide from Mineral Processing", Proceedings of a Workshop, Salt Lake City, Utah, February 2-3, 1982
	[d] "Groundwater Quality in New Jersey: An Investigation of Toxic Contaminants", Robert Tucker, Ph.D, March 1982
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	[e] Letter from Fred Fox, Homestake Mining Company, to Robert Hoye, Pedco Environmental Inc. on Bureau of Mines Study, April 3, 1984
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	[g] Draft Report by The Homestake Mine, Lead, South Dakota on Bureau of Mines Study, June 1984
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	[b] Lucky Friday Mine Waste Study
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	[a] Comments of Monsanto Chemical Company on the Proposed Rule Reinterpreting the Mining Waste Exclusion from RCRA (50 FR 40292-40302, October 2, 1985), December 26, 1985
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	[a] Comments on EPA Mine Waste Report by Dr. Donald Baker on Behalf of Gold Fields Mining Corporation
	[b] Position Paper Prepared for the California Mining Association Solid Waste Committee on EPA Report to Congress (December 1985) by I. Hutchison and A. Smith, Steffen, Robertson and Kirsten

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[a] Comments of the American Mining Congress on the EPA's Notice of Proposed Rulemaking: 40 CFR Part 261 - Mining Waste Exclusion 50 FR 40292 (Oct 2, 1985), January 2, 1985

[a.1] Statement of Jim Santini on RCRA Mining Waste Exclusion Before the EPA, November 14, 1985

[a.2] Report to the Congress of the United States by the Comptroller General, The U.S. Mining and Mineral Processing Industry: An Analysis of Trends and Implications

[a.3] Comments of the American Mining Congress Solid Waste Subcommittee concerning Amendment of 40 CFR §261.4(B), Published on November 10, 1980

[a.4] Memorandum from Jack McGraw, OSWER Acting Assistant Administrator, on Proposed Reinterpretation of the Mining Waste Exclusion, July 23, 1985

[a.5] Memorandum from John H. Skinner, Director, OSWER, to Director, Waste Management Division, Regions I-X on Applicability of the "Mixture" and "Derived from" Rules to Petroleum Refinery Wastewater Systems

[a.6] Brief of Petitioner American Mining Congress, et al. on Petitition for Review of Regulations of the U.S. EPA, September 20, 1985

[a.7] Draft Report to Congress on Wastes from the Extraction and Beneficiation of Metallic Ores, Phosphate Rock, Asbestos, Overburden from Uranium Mining, and Oil Shale, October 28, 1985

[a.8] Final Report to Lead Industries Association and Cadmium Council on Technical Evaluation of the U.S. EPA Extraction Procedure, October, 15, 1984

[a.9] A Critique of the Economic Analysis in the U.S. EPA's Study of the Economic Cost of the U.S. Metal Smelting Industries of Proposed Changes in Regulations Concerning the Disposal of Solid Waste, Conducted by Economic Consulting Services Inc. for the American Mining Congress, December 23, 1985

[a.10] Decline in U.S. Mineral Production, Value and Employment and Its Impact on the Mining Industry

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	[a.12] Critical Review of the ICF Report to EPA: "An Analysis of Human Health Risks Associated with the Management of Hazardous Wastes from the Primary Smelting and Refining Industries", (Draft Report, February, 1985), Prepared for the American Mining Congress by The Gradient Corporation, December 19, 1985
	[a.13] References for Section IX.C.1 - Arsenic
	[a.14] References for Section IX.C.2 - Cadmium
	[b] Letters to Cliff Rothenstein, OSWER Economic Analysis Branch, and Dr. Winston J. Porter, OSWER Assistant Administrator, from Wayne Merchant, Acting Assistant Secretary for Water and Science, U.S. Department of the Interior, December 17, 1985/December 27, 1985
	[c] Comments for Public Presentation, Washington, D.C., March 11, 1986, on EPA's Report to Congress, "Wastes from the Extraction and Beneficiation of Metallic Ores, Phosphate Rock, Asbestos, Overburden from Uranium Mining, and Oil Shale", by Brian L. Murphy, Ph.D., The Gradient Corporation
	[d] Executive Summary, EPA/PEDCo Mine Waste Management Study: Overview Volume I, Prepared for American Mining Congress by Dames and Moore, February 1985
	[e] Final Report Results of Phase 1 and 2 Ground Water Monitoring Data Review and General Ground Water Quality Evaluation, Prepared for the American Mining Congress by Dames and Moore, March 25, 1986
	[f] 1982 Water Data Acquisition Program, Surface Water and Groundwater Quality, Florida Phosphate Council Members, Volume 2, Prepared by Gordon F. Palm & Associates, Inc., March 15, 1983
	[f.1] 1983 Water Data Acquisition Program, Florida Phosphate Council Members, Volume 4, Appendix B, Phosphate Chemical Plants and Appendix C, Prepared by Gordon F. Palm and Associates, Inc., October 14, 1983

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MWRC 046	[f.2] 1984 Priority Pollutants Water Data Acquisition Program, Sand Tailings Water Quality Phosphate Mines, Florida Phosphate Council Members, Volume 1, Prepared by Gordon F. Palm and Associates, Inc., July 24, 1984
	[f.3] 1984 Priority Pollutants Water Data Acquisition Program, Sand Tailings Water Quality Phosphate Mines, Florida Phosphate Council Members, Volume 2, Prepared by Gordon F. Palm and Associates, August 3, 1984
	[f.4] 1983 Radiation Water Data Acquisition Program, Surface Water and Ground Water Quality, Florida Phosphate Council Members, Volume 1, Prepared by Gordon F. Palm and Associates, Inc., September 15, 1983
	[f.5] Chemicals and Reagents Used in the Beneficiation of Phosphate Rock, Prepared by Gordon F. Palm and Associates, Inc., April 18, 1983
	[f.6] 1983 Water Data Acquisition Program, Florida Phosphate Council Members, Volume 3, Appendix A - Phosphate Mines, 12,000 through 20,000, Prepared by Gordon F. Palm and Associates, Inc.
	[g] A Critique of the Compliance Cost Estimates in the EPA's Study of the Effects of Proposed Changes in Regulations Concerning the Disposal of Mine Wastes; Prepared by Economic Consulting Services, Inc., for the American Mining Congress, March 25, 1986
	[h] Review of the SCS Damage Case Study, Prepared by TRC Environmental Consultants, Inc., July 10, 1985
	[i] Testimony of William W. Beck, Jr. P.G., TRC Environmental Consultants, Inc., Relevant to EPA's Report to Congress, "Waste from the Extraction and Beneficiation of Metallic Ores, Phosphate Rock, Asbestos, Overburden from Uranium Mining and Oil Shale", March 11, 1986
	[j] Final Report Technical Evaluation of the U.S. EPA Extraction Procedure; Report to Lead Industries Association and Cadmium Council from American Resources Corporation and Environmental Engineering and Management, October 15, 1984
	[k] Letter from John A. Knebel, President, American Mining Congress to EPA/OSW Docket on Hazardous Waste Management System, Land Disposal Restrictions; Proposed Rule (51 FR 1602, January 14, 1986), March 17, 1986

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MWRC 046	[l] Letter from Marion E. Loomis, Associate Vice President, Wyoming Mining Association, to Eric J. Hinzel, Wyoming Department of Environmental Quality, July 6, 1979
	[1.1] Attachment 1, Radiological Impact Analysis of the Wyoming Mining Association Position to Control Ra-226 Concentration in Reclaimed Overburden, Prepared for Wyoming Department of Environmental Quality by Wyoming Mining Association, July 1979
	[1.2] Appendix I to 46L-1
	[1.3] Appendix II to 46 L-1, Residential Exposure Evaluation
	[1.4] U.S. Regulatory Commission, Office of Standards Development, Calculational Models for Estimating Radiation Doses to Man from Airborne Radioactive Materials Resulting from Uranium Milling Operations, May 1979
	[1.5] Letter from Keith J. Scheager, Ph.D., President, ALARA, Inc., to Mr. Marion Loomis, Hitching Post Inn, Comments on the "Radiological Impact Analysis of the Wyoming Mining Association Position to Control Radium-226 Concentrations in Reclaimed Overburden", July 3, 1979
	[m] Statement of Stephanie Baker on Behalf of the American Mining Congress, Uranium Environmental Subcommittee, Concerning Regulations Proposed by EPA on December 18, 1978, Pursuant to Sections 3001 and 3004 of RCRA Before U.S. EPA in Denver, March 9, 1979
	[n] A.G. Scott, DSMA - ACRES, Behavior of Radon and Its Progeny in Home Atmospheres
	[o] Assessment of the Scientific Basis for Existing Federal Limitations on Radiation Exposure to Underground Uranium Mines, Prepared for the American Mining Congress by SENES Consultants Limited, October, 1984
	[p] Letter from J. Allen Overton, Jr., President, The American Mining Congress, to the Honorable William Brock, Secretary of Labor, December 3, 1985
	[p.1] Letter from J. Allen Overton, Jr., President The American Mining Corporation to the Docket Officer, U.S. Department of Labor, on the Notice of Proposed Rulemaking on Occupational Exposure to Asbestos -- 1970.1001 Federal Register, Volume 49, No. 70, April 10, 1984, June 8, 1984

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	[p.3]	Federal Register, Vol. 49, No. 70, p. 14122, Tuesday, April 10, 1984, Proposed Rules
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